January 1991 Vol. 4 Nº 4 Price £2.00

Archive

The Subscription Magazine for Archimedes Users

Direct Screen Access

Using the APEC Prototyping Card

New Columns: Econet & Multi-media

Reviews: Hostages, ArcLight, Ballerena, Jiglet, IDE Drives, Art Machine, Sharewares 33 & 36, Chocks Away, Noah Tools, Pysanki, DropShip, R.U. Games Omnibus, BugHunter in Space, Starfleet Encounter, RoboLogo, Armatron, RTFM Joystick Interface.

ARM3 problems?

It seems from various sources, that the supply of 30 MHz ARM3 chips is getting bad. It's OK getting 24 MHz chips, but V.L.S.I. don't seem to be able to get many 30 MHz chips off the production line. This is causing problems for those producing ARM3 upgrades and also for Acorn with their A540's. We have still only had five of the ten A540's we ordered in the autumn.

The other thing to watch out for is that the cost of ram seems to have 'bottomed out' and is now beginning to rise again. This will affect the price of all ram upgrades in due course, so my advice is that if you are thinking of getting a memory upgrade, you should do so as soon as possible. We have stocks of memory upgrades for A3000, A410 and A540 (for the lucky few) although, as I have explained in the Products Available section, we have stopped stocking A310 ram upgrades.

Still growing!

Still, it's by no means all doom and gloom. New software and hardware products for the Archimedes are still appearing with amazing regularity and more and more schools and colleges are equipping themselves with Archimedes computers as their budgets permit. There's still a lot of life left in the Acorn Archimedes, that's for sure.

Once again, thanks to everyone for subscribing and a special thanks to the dozens and dozens of subscribers who have made contributions to the Archive magazine. Keep it coming and, together, we'll continue to make Archive the best Archimedes magazine available.

With very best wishes for a happy and peaceful 1991,

Paul B.

Government Health Warning – Reading this could seriously affect your spiritual health.

Sometimes, people say to me, "I wish I had your faith" but what does it mean, "to have faith". Some people think of it as "believing the unbelievable" – you have to drag up enough will-power to believe a set of facts about God. Forget it! That's totally the wrong idea of faith. Let's start again…

How about this… "I have great faith in Jane. She's a wonderful person." If you know Jane well and she is really reliable, honest, helpful etc, you say you have faith in her. If you then get someone accusing her of various things, you may look into the allegations, but you are fairly suspicious of the accuser because of what you know of Jane's character. The more you get to know Jane, the stronger your faith in her becomes. (You can't take this analogy too far,because people, sadly, let us down – even those closest to us.)

Now that's more like what the bible means by "faith" – it's trust in a **person**, not belief in a set of dogmas. "But how can you know **God** as a **person**?" Well, that's where Jesus comes in. He is God in human form (well, that's what the bible claims) so if we get to know Jesus, we are getting to know God. And that's where I started back in 1968, reading about Jesus in the bible. As I have got to know Him better over the years, my knowledge of Him and my faith in Him have increased.

The miraculous bit is where, as you get to know more **about** Jesus, he somehow steps out of the pages of history and you find that you can know him as a person in 1991. Try it for yourself and see – lot's of quite sane and sensible people have! Brush the dust off that bible, find one of the gospels (Matthew, Mark, Luke or John) and start reading. It can't do you any harm, can it?!

Archive

Volume 4 • Nº 4 • January 1991

Contents

Products Available 2
Competition Corner 4
Small Ads 4
Comment Column 7
Hints & Tips 8
Help!!! 9
Multi-media Column 12
Econet Column 15
Hostages Review.........................16
Mountains, Euclid, ArcLight etc.19
Ballerena Review 20
Hardware Column.......................21
The Art Machine 27
Jiglet Review...............................30
Language Column.......................31
Shareware Nº 33 33
PipeLine 35
Chocks Away Review 40
Direct Screen Access 41
Noah Software Review 44
Atomwide Prototyping Card.......46
Risc User Games Omnibus 48
Shareware Nº36 49
Pysanki, DropShip, BugHunter ..52
Starfleet Encounter Review 54
RoboLogo Review 54
Armatron Review........................55
RTFM Joystick Interface 55
Fact-File 57

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Products Available

- **A3000 SCSI drives** – In line with the trend for lower drive prices as the volume of sales increase, Oak Solutions (formerly "Oak Computers") have produced a range of A3000 external drives – rather delightfully named, Worra Winnies. The range of drives is: 20M, 45M and 80M at £349, £449 and £649 respectively (plus £10 p&p + VAT). The Archive prices are £390, £490 and £690 respectively, inclusive. These drives are slightly slower than their 310/410 equivalents, but not markedly so for the difference in price.

- **A310 RAM upgrades** – We have decided to stop stocking A310 ram upgrades because we have not really got the staff to cope with all the work of doing the upgrades. If you want an A310 RAM upgrade, contact Avie Electronics on 0603–416863 and talk to Alex or contact Atomwide on 0689–838852 and talk to Martin.

- **ArcMonitor** is a machine code monitor from Cambridge International Software. It takes the form of a relocatable module, but with mouse control, and implements all the ARM instruction set as well as the four processor modes. The screen layout has five windows for: disassembly and memory dump, commands, help, program output and processor information. We haven't seen it yet, but it sounds very impressive. £24.95 from CIS or £23 through Archive.

- **BBC Emulator improved** – Acorn have produced a new version of the BBC emulator which also provides utilities to help you to transfer BBC programs and develop them further on the Archimedes. It comes with a "comprehensive manual" which is also on the disc. The cost is £19.55 from Acorn Direct (not through Archive).

- **Bulk Disc Copier** – We have found a new auto-loader which will attach to the Archimedes computer. Now you can copy discs at a rate of 40 per hour. This new Xpress auto-loader comes from Mission Six in the States and, when linked up to an Archimedes using our new bit copying software, allows fast and easy disc duplication. Although it is a superior auto-loader to the one we were supplying previously, we are getting better discount from the importers, so we can offer the whole bundle including interface, cables, auto-loader and software for the same price of £2,300 +VAT. The auto-loader can also be used to copy 5.25" discs – just take the 3.5" drive out and put in a 5.25" drive – the change-over takes less than a minute.

- **Expansion box for the A3000** – Wild Vision have produced a box which will hold two full width or three half width podules. The box is £139 + VAT. *(I saw the unit being demonstrated and would advise readers to check whether or not it is now fitted with anything to fix it firmly to the A3000 case. In the prototype I saw, the box was held to the A3000 purely by the pins of the Euro-connector. I moved the computer backwards and forwards on the table two or three times and the expansion box worked loose. Ed.)*

- **Freddy Teddy is really ready!** – Topologika have produced the first of their educational packs for the very young. It is aimed at developing concepts of colour matching, colour sequencing, counting, comparison and visual discrimination. The pack contains three programs in which Teddy visits a bakery, works in a factory, goes on a balloon journey and does acrobatics on a skateboard! It also comes with a story book. The price is £19.95 from Topologika or £18 through Archive.

- **Measure-IT** is an interface box with a user guide and either primary or secondary based software for £64.50 +VAT from Resource or £69 through Archive. The primary software is a data-logging package called PriSM produced by N.C.E.T. and the secondary package is "Toolkit", writen by Laurence Rogers, which is already widely used in secondary schools. Also included with the software and interface box are two temperature sensors, a light level sensor and a push switch.

- **Multiple modes** on the Archimedes. GL Consulting Ltd have produced a utility to provide a wide range of screen modes such as SVGA, XGA, 8514/A etc. The introductory price of the package is just £7.50. For more details, contact Martin Thorpe at GL Consulting.

- **OCR** is here! The various Archive subscribers who have asked about optical character recognition software will be pleased to know that Irlam Instruments have a system up and running that will allow you to convert monochrome sprites into text files. The system is written in machine code for speed and is fully trainable for use with a wide range of fonts. Available now from Irlam for about £150 (the price has not been finalised) or through Archive at a suitable discount (see Price List for details, hopefully).

- **Shareware 37** is now available. It consists mainly of utilities: disc free space monitor, BASIC editor starter, find file, help, application launcher, current directory setter, text editor (like TWIN), system variable editor, font handling module, a list of the characteristics of virtually every known hard drive (ST506, SCSI etc.), alternative alphabet provider, faster PC emulator screen updates and a WIMP interface manager module.

This module is very powerful and worthy of further explanation – it helps programmers implement colourful and pleasant graphical user interfaces for WIMP based applications. It provides additional validation string commands which allow programmers to design WIMP applications that look and feel like Computer Concepts Impression, to provide interactive help, to control other icons and to control pointer shapes. Acorn are obviously impressed with the idea since, even though it is a PD program, they have given Simon Huntington, the author, an official SWI chunk number and even allowed him to use the WIMP_ prefix. As well as the interface manager module, Shareware 37 contains the full documentation, a typical C application and a modified version of !FormEd.

- **Shareware 38** is now available. It contains three applications – desktop address book, desktop graph plotting with best fit and a BASIC curve plotting program; two games – chain (a two-player strategy game) and tetris; plus seven utilities: clipboard for text icons, outline font fixer (so that !FontEd can read them), desktop calendar, draw file italiciser, application launcher, screen mode switcher and a font folder switcher.

- **Tools** is the latest graphics library pack from Micro Studios containing lots of sprites of… tools! £19.95 or £18 through Archive.

- **TV adaptor** – various folk have been asking about the availability of PAL TV adaptors for the Archimedes. They are now available through Norwich Computer Services at £35. This includes a mains power supply and the cables necessary to connect between the RGB output of the computer and the TV input socket.

- **TwinWorld** from Cygnus Software is an impressive arcade style adventure with lots of baddies to avoid or kill, doors to unlock, tunnels to explore etc. The graphics and sound are very good indeed. In fact, Micro User gave it a 10 out of 10 rating on all counts in its review last month. The price is £19.95 from Cygnus or £18 through Archive.

Review Software Received...

We have received review copies of the following software: "Tools" graphics library pack from Micro Studios; Carewares 4, 5, 6 and 10; Sharewares 37 and 38; Ivoryash's teletext adaptor software; HoneyPot from RESOURCE; Toolbox 1 from Type Mismatch; Micro-Aid business accounts; October PipeLine disc from Abacus Training.

(Would the person who has ProText 5 for review contact the Archive office as we have a later version for you? Unfortunately, I cannot remember who it was that I give it to!)

January Sales

In line with other retailing organisations, NCS is clearing some of the stocks at "knock-down" prices! Stocks are limited so PLEASE either send separate cheques for each item or, better still, ring to find out if they are still available and we will put them on one side for you.

PAL TV adaptors – £25 each

Presenter II (without HotLinks) – £35

Taxan 795 (1 only) – £490

Oak Hard drives – We want to reduce our stocks of Oak Hard drives. This is mainly because the increasingly wide range of different drives now available makes it rather expensive to keep more than one of each type in stock. These are all full specification drives and come complete with 16 bit SCSI interface:

A300/400 external drives

45M (1 only) – £590 (was £655)

100M (1 only) – £1030 (was £1130)

200M (1 only) – £1350 (was £1490)

A300/400 internal drives

45M (1 only) – £590 (was £655)

100M (1 only) – £1030 (was £1130)

200M (1 only) – £1350 (was £1490)

A3000 drives (full speed, not Worra Winnies)

45M (2 only) – £560 (was £655 cf WW price £490)

45M in bridge (1 only) – £600 (was £695)

80M (2 only) – £750 (was £890 cf WW price £690)

A310 RAM upgrades – We have decided to stop stocking A310 ram upgrades and want to clear the last remaining stocks, so we have a couple of the Protokote 1 to 4M upgrades to sell. They were £600 but we are prepared to sell them for £490 on a user-fitting basis.

Competition Corner

Colin Singleton

January's problem will not take up much space in Archive, but could take as much time and space in your Archimedes as you are prepared to allow it.

Calculating the value of π to a large number of decimal places has long been a classic exercise for number-crunching machines, but the base of natural logarithms, *e*, has received rather less attention. So that is this month's task. The value of e is $2 + {}^1/_2 + {}^1/_6 + {}^1/_{24} + {}^1/_{120} + \ldots$ where the denominators are the factorials 2*3*4*5…

After I had decided to offer this as this month's challenge, another magazine published coding to calculate *e* to (almost) any number of decimal places. If you crib their coding I do not think you will win the prize.

This competition will have to be judged partly on speed and partly on endurance, and the prize may have to be split accordingly.

Please submit times to generate and display 100 places, 1000, … and send a printout of the first 1000. Own up if you are using ARM3 or a 540.

Entries and comments please either to Paul at NCS (note new address) or direct to me at 41 St Quentin Drive, Sheffield S17 4PN.

Small Ads

- **1 Mbyte memory upgrade** for A3000 £50. Also, 3 Mbytes of ram for A410 £40 per Mbyte. All brand new. Phone 0780–54537 anytime.

- **A310 colour** + 4M memory + 40M HDrive, CC ROM/RAM podule, Acorn ANSI 'C', PRManuals + software £1600. Phone 0258–45281 extn 2209 during office hours.

- **Acorn 1 Mb ram board** for A3000, £50. Phone Steve Bradbury on 0242–518500 (daytime).

- **Archimedes Assembly Language** (Ginns) £7.50, Acorn 20M internal hard disc from A440 £120. Prices include postage. Phone Colin on 0786–61501 evenings & w/e.

- **Head-crashed Miniscribe** 20M disk wanted. I have dead electronics with a working drive and need a drive which is mechanically dead but electrically alive. Contact Andrew Stevens on 0256–771–542 (after 7 p.m.) or 031–225–7774 (daytime).

- **Integrex Colourjet 132** printer with spare cartridge £350, Linear Graphics A3M plotter (auto pen select) £350. Phone Mike on 0322–526425 or via Prestel Mbox.

- **PC Emulator**, as new, £50. Contact James Bradshaw on 028484–315.

- **Charity Sales** – The following items are available for sale. All the money goes to charity but PLEASE do not just send money – ring to check availability first. Thank you.

A4 plotter £25 + carriage, CC ROM/RAM podule £25, StarTrader £5, Quazer £5, Trivial Pursuit £15, PC Emulator inc DR-DOS £30, PAL TV adaptor £18, Interdictor 1 £9, Guide to Acorn DTP (book & disc) £8, Artisan Support disc £2, InterSheet ROMs for BBC Micro £20, Licenced to Kill for IBM PC!!!! £3.

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- *New REMOVABLE Hard Discs*
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① *We do not sell every product relating to the production of documents and artwork on an Archimedes, but the ones we offer for sale are selected by us as the best value for money product of its type.*

② *Although we offer a limited selection, you can buy everything you need to produce documents or artwork of any kind at very competitive prices.*

③ *HOT LINE SUPPORT ~ If you have a problem persuading something you have bought from us to do just what you want it to, then simply give us a call ~ we can solve the problem.*

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We can supply any **Archimedes** from The *A3000 (£545)* to the latest *A540/1 (£2495)*, printers, from the *Canon BJ-10e (£299)* to the *High resolution 600 dpi Laser Printer (£1395)*, or *EIZO multiscan monitors (£425)*

Removable Hard Discs

45Mb removable hard disc drives (£460) ~ this is a new concept in data storage for Archimedes users since it was previously only available to Macintosh users. *Now you can have as many Hard Discs as you like at only £75 each.* A storage medium with the advantages of all the speed and capacity of a hard disc but with the convenience of a floppy.

Software

You can buy all your DTP software from us. We sell all of the more popular packages such as *Impression II (£145), !Poster (£79), !FontFX (£10).* We also have *TRUE (not an emulation) 360 dpi Canon Bubble Jet Printer Drivers (£10)*, **Clip Art** and **more**.

For more information about any DTP product

telephone (24hrs) or Fax (office hours): 0344 872923
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ARM 3 upgrade - £495

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- Four layer printed circuit boards
- Courier collection of your machine

8 Mb upgrade - £860

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- All products are cross-compatible
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- Typical combination A310 4 Mb and ARM3 £950
- Dealer enquires welcome
- Phone for full details on all products

All prices include VAT at 15%

ATOMWIDE

23 The Greenway Orpington Kent BR5 2AY Tel 0689 838852 Fax 0689 896088

Comment Column

• **A310 enhancements** – As an A310 owner, I am often astonished to read peoples complaints that Acorn have ditched them, leaving them with an obsolete machine. Like many other owners, I have studied the various upgrades and have come to the conclusion that the 400 (or 500) series is not worth the extra expense. Indeed, most of the I.C's in my (expanded) A310 are the same as those found in the rather expensive A540. With 70 nSec RAM fitted, and an ARM3/MEMC1a with some addition circuitry to toggle the internal clock between 36 MHz and 24 MHz (depending on IOC access), I think a 12 MHz A310 is possible. This would perform on a par with an A540!

In comparison, my trusty BEEB came out in about 1982. Eight years later it is still not possible to write a Basic program of more than 48 kbytes or get a 6502 second processor with a clock speed of more than 4 MHz? Yours Sinisterly, Ralph Barrett.

• **FlexiFile comments** – I would like to pass on a couple of comments about the database "FlexiFile" from Minerva. I have been extensively using this database since September. Although it generally works very well, I do think it has a number of short comings.

FlexiFile works exclusively from the desktop and most operations are controlled by the mouse. This works well but can become a little time consuming as there are no keyboard short cuts. I am also a little disappointed to find out that it cannot perform certain functions that were available with "ViewStore" on a BBC micro in 1985! In particular, input validation strings, numeric limit checking, 'scrolling fields' and help prompts. There is also no dedicated "date" field (making date checking more difficult). Some of these facilities I would find particularly useful. I hope these features could be added to future versions.

The only real limitation of the program at the moment is that the file size is fixed at the time the database is created, it does NOT dynamically expand as records are added. On the whole though, the program is excellent. I use several data files that total over 850k and I find it very easy to get the program to do what I require. The only major change I would like to see in the future is somewhat better report formatting. Even so, I would have no hesitation in recommending this program to someone who wants a powerful database that works well within the desktop. I can't wait for "FlexiFile II"! Mark Taylor

• **Pipemania** – This game has been a great success on other machines and should repeat this success on the Archimedes. I am pleased to say that the Archimedes version has been significantly enhanced – the presentation is slick and some of the graphics are excellent. Empire have also included an "Archimedes scoring mode", which awards extra points.

The software can be installed on a hard disc but it needs to read a few bytes of the floppy disc after loading the main game off the hard disc, presumably for protection purposes. Once loaded, the game displays an attractive rotating "Pipemania" logo. The player can choose to start the game straight away, or can go to an options page which allows keys to be redefined and other options to be set such as skill level etc. A jump level option is also provided which has a small bug. It is impossible to jump levels with keys selected for player one. This screen also allows the selection of the two player option; this can be great fun but it is easy to get frustrated with the other player for either not helping or taking over!

So, what is the objective of the game? Well, the game is played on a kind of grid. An unpleasant substance, called "Flooz", flows from an outlet somewhere on the grid and it is the player's job to place pipes on the grid to prevent the Flooz from escaping. The player must take pieces of pipe from a dispenser in a set order but may place the piece where they wish. Of course, the game is more complicated than that, with barriers, one way pieces, end pieces, reservoirs and more!

From the starting jingle to the originally implemented "The End" message, the presentation of Pipemania is faultless. Add this to a fast paced, thrilling and fun game and you have a classic. My only criticism is the price, which I think is slightly too high for a game of this type but Empire have taken a gamble in entering the Archimedes world, so I believe it is worth every penny. Thomas Cooke, Weymouth.

• **Price wars?** – I recently had a request to see if I would be "prepared to match xxx's price" for a certain piece of Archimedes hardware. My reply may well be of more general interest.

I am sorry to say that, as a matter of policy, we are not "playing with prices" to beat xxx. We have lost quite a lot of business to them but we do not think it is good for the industry as a whole (and therefore not good for the customers in the long run) to slash price margins to the bare minimum. It encourages (nay forces) dealers to give minimal service in support of purchases made. You would be amazed at the number of people who come to us and say, "I bought such and such from so and so and it doesn't work. Can you sort out the problem for me?" Then when we ask if they have contacted so and so, they say they have but weren't able to get them to do anything for them in response to their problems!

Good service costs money and **someone** has to pay for it. You may be lucky and buy your goods cheaply from the likes of xxx and not have any problems but if you do have problems with the goods and cannot get satisfaction from xxx, we will be a bit sympathetic, but not **very** sympathetic! If xxx is doing something downright dishonest then we will, of course, champion your cause but that is a different issue. Basically, what it boils down to is that you get what you pay for. Ed.

Hints & Tips

• **Cheats** – Here are some cheats for various games. *(I suggest that if you do any of these, you do not use the original disc but rather work on a copy. Ed.)*

Cheat for Minerva's BattleTank – If you run the following program you will have however many lives you specified at line 20.

```
10 *LOAD $.!TANKGAME.!OBJECT 10000
20 ?&1172C= (Number of lives 1-255)
30 *SAVE $.!TANKGAME.!OBJECT
      10000 +49D0
40 *SETTYPE $.!TANKGAME.!OBJECT FF8
```

Cheat for 4th Dimension's Inertia – Type in the following and then each time you loose a life, you won't!

```
*LOAD $.!INERTIA.INERTIA 8F00
3111 CALL lplus
SAVE "$.!INERTIA.INERTIA"
```

Cheat for 4th Dimension's Man-At-Arms – The passwords for the 3 stages are:- INCUBUS, STRANGE and PULSARS

```
10 *LOAD $.!MANATARMS.CASTLE2 10000
20 ?&1CFA0=&7F : REM Number of lives
30 ?&1C8AC=&75 : REM Energy level
                   (First 2 hex digits)
40 ?&1C8AD=&30 : REM Energy level
      (Last 2 hex digits)
50 ?&1C8D8=&7F : REM Nº of Punches
60 *SAVE $.!MANATARMS.CASTLE2
              10000 +10000 10000 10000
```

When you run this program, it will allow you loads of lives, punches and lots of energy. Be careful not to set any of the variables at &FF because it does tend to make the program crash!

Cheat for Minerva's Red Shift – Once the game has loaded, type the following:

```
PHASING GERALD
```

Note: When you have pressed <H>, the screen will change to the Help screen. Take no notice of this and keep typing the rest of the words in. Remember that there is a space between the two words!

If you have entered this correctly you will hear a bleep. Then just press <1> or <2> to play the game and when your Energy is low just press <E> and you'll see the energy level is full again! Also, when your Turbo Energy is low press <T> and you will be back to full strength!

Cheat for 4th Dimension's E-Type – The following will give you as many minutes as you like to get round each track.

```
10 *LOAD $.!E-TYPE.GAMECODE 9000
20 ?&9F36=3 : REM Number of mins
                 to round each track!
30 *SAVE $.!E-TYPE.GAMECODE 9000
                  +3BF2C 9000 9000
```

Type in the above and you'll have all the time you want to round each track!

Mark Faulkner

- **DOS RAM Disc** – In DOS, it is possible to set up a RAM disc and indeed, for many applications, it is vital to do so if one does not have the luxury of a hard disc. Regular DOS supports a maximum of 640 kbytes of RAM, although we did learn about Extended Memory in last month's Archive. The problem with a DOS RAM disc is that the memory is actually taken from the 640k system RAM. At least it certainly is with current versions of the PC emulator.

A few months ago, an application appeared on the magazine disc called !PCRamDisc. This made use of the fact that the PC emulator can support up to two "hard disc" partitions and that one of these could be in the Archimedes RAM disc filing system. (In fact one of these can be on an ADFS floppy!). In this way, a large RAM disc can be used within DOS which does not take anything from the regulation DOS 640k. This seemed a really good idea and I was eager to try it out.

The program which produces the DOS partition is a variation of the Acorn program to construct a hard disc partition but with the filing system and paths changed and with the allowed partition sizes also changed to more convenient values. Having created such a partition, the !Run2 file must be modified to tell the machine where the partitions are. Then, when the emulator is run, the new "drive" must be initialised using FDISK and then formatted using FORMAT. This part really annoyed me as I had to do it each time I used the emulator, and I kept forgetting what to do.

It seemed a good idea to create a ready-formatted and initialised partition before entering the emulator. I am sure someone could write a program to do this, but not me. Obviously it would be silly to store, say, a 2 megabyte partition in readiness; this is just a waste of space. However, I discovered that an initialised, formatted, but otherwise empty DOS partition of one megabyte capacity could be compressed to just over a kilobyte using Archimedes ARC, a Public Domain file compression/decompression program written by David Pilling.

On the magazine disc there is an application called !PCRamDisk (note the different spelling). This contains a compressed but empty DOS partition which is decompressed into the RAMFS before invoking the PC emulator. Please read the !Help file before using it as the !Run2 file of the emulator is overwritten when the application is run.

Brian Cowan

Help!!!

- **Christian clip art** needed. Does anyone know of any? D Crofts, Bury St Edmunds.
- **Front fascia wanted** for A310 with single disc drive. Contact Roger on 0780–54537. (Or send to N.C.S. for charity sale!)
- **HCR EPROM programmer** – Has anyone written the necessary software to get one of these programmers working on the Archimedes? H McDonald, Bexhill-on-Sea.
- **Mannesman Tally Spirit 80** – Has anyone got a RISC-OS driver for one of this printers? W B Rees, Tenby.
- **RISC-OS driver for the Canon BJ103e** – Has anyone got one? A. L. E. Griffiths, Trefin.
- **Word-processor for primary use** – Does anyone know of a WP suitable for use by an eight year-old with learning difficulties? Ideally, it should provide the facility to pick up words from a list and insert them simply into the text. D Alden, Norfolk.

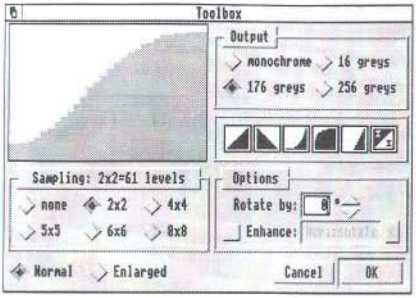
Help offered

- **Midi problems** – Mr D Hill asked for help with Clares and EMR packages. The problem can be solved very simply because EMR provide an Acorn Midi emulator that makes their Midi look just like the Acorn one. (Why, you may ask, do they need this if their board is Acorn compatible?) You will note also that Stewart Watson states on page 24, last month, that he is using Rhapsody with the EMR Midi 2 podule and experiencing no problems.

The Midi facility in Armadeus is minimal and it does not work with some keyboard combinations. Dave Clare, Clares Micro Supplies.

SCAN LIGHT Plus

The latest generation Scan-Light Plus software provides a new easy to use and very powerful interface to the range of Scan-Light scanners and represents the most advanced software available for monochrome scanners on the Archimedes.



Scan-Light toolbox.

The main features of Scan-Light Plus centre around the scan toolbox. This controls the altered image view and allows the original scaled image to be sampled or anti-aliased in numerous different ways. This feature allows monochrome dithered scans to be turned into full grey-level sprites, ideal for incorporation into DTP or other programs. For example 4 by 4 sampling provides 16 grey-level images, while 8 by 8 sampling will turn an image into a 64 grey-level. The grey-map allows precise and accurate control over these grey-levels. The grey-map cannot only lighten or darken the image but also invert it or, more usefully, compensate for any non-linearities in the original picture or the printer. The grey map provides direct control over the gamma correction curve. The toolbox also controls the number of greys in the output file - it's even possible to typeset images with 176 grey-levels suitable for photographic quality results.

Features Include:

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- Preview during scan to indicate progress.
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Multi-media Column

Ian Lynch

One of the things that interests me about the Archimedes is the fact that even though it is now three and a half years old, (a long time in technological terms) there are still areas where it has the potential to solve the problems that other computers can't. In DTP, we have seen the development of low cost software tools which out-perform packages many times more expensive on PCs and Macs.

It is the processing speed of the ARM which facilitates the applications, but RISC-OS is equally important in providing the user with a tool for harnessing the computing power in a very ergonomic environment. Although Windows 3 makes PC's far more competitive in the "user interface stakes", RISC-OS still has advantages such as being in ROM and hence readily available at switch on, working with all facilities on all machines, providing an outline font manager and supporting direct in memory data transfer for the majority of applications. These are all important in personal productivity but perhaps the greatest potential provided by the ARM and RISC-OS is in the field of multi-media.

What is it?

Multi-media is a term used to describe information handling in a variety of contexts. The printed text medium is perhaps the most familiar, but graphics (through DTP for example) are now becoming as common. Moving pictures and high quality audio are available but, to most users, these are restricted to demos such as Render Bender or Euclid animations and sound samples from Armadeus or incorporated in Tracker music. It would be much more flexible to have software which allowed all types of information to be mixed freely and controlled by an ordinary user.

Unfortunately, multi-media applications can consume prodigious amounts of memory and require data transfer rates which are quite impossible without employing one or two tricks. For example, imagine a mode 28 screen (256 colour VGA) which takes 320k of memory, being projected at 25 frames per second to provide a high quality full screen animation. This would require 320k x 25 = 8 Mb of data to be moved every second, an impossibility for even the fastest SCSI hard disc drives. The way round this problem is to simply avoid moving all the data. This can be done by compression of the data in each frame, and by just storing and projecting the differences between successive frames during the animation. This can be done because most frames will be very similar to the previous one. Of course, such compressions and animation techniques have to be performed in "real time" so that, as far as the user is concerned, there is no delay, or the animation would appear jerky and disrupted.

The general purpose processors in microcomputers (including ARM3) have not got the capability to run the computer and do these data compressions in real time for full screen high quality pictures. If we add simultaneous audio to this as well so that digitised pictures and sound are synchronised, the situation is many times worse. However, many people believe that multi-media is the way computers will evolve and so a lot of work is being done to find ways of achieving the data handling required.

Analogue interaction

In fact, there is a way of producing video quality interaction under computer control, and it has been around for some time. This is the video disc of which there are literally hundreds, often used in industrial training. In education and BBC circles, the Doomsday system is probably the most familiar.

Video discs have the film and sound recorded as a continually varying signal (analogue) in rather the same way as a video tape, but with the advantage that any sequence of film can be accessed very much more rapidly than would be the case with re-winding a tape. By using "genlock", the video signal and the signal from the computer can be combined to provide one picture. So, computer graphics can be used interactively with the film without the computer having to handle the moving pictures and audio, except for controlling the machine from which they are played. The Doomsday system suffered from many problems and, as with most early attempts in a new field, now seems very crude. The BBC Master could not produce the graphics quality required to make the combined pictures look as if they were from the same source and there was not the flexibility in computer control that is needed for high level intuitive interaction. At over £4000, the system was also too expensive for most schools and home users.

An ARM solution

ILP, a Newcastle based company are now marketing a system based on analogue technology and using an A3000 to control it and produce graphics overlays. It is significantly lower in price than other interactive systems at under £2000 including computer, video player and three discs with materials for teaching the National Curriculum. The quality of the materials is superb and the delivery as professional as anything in the market on any other platform. Another example of ARM technology providing lower prices and better quality.

Digital only?

Some people say that analogue discs, as described above, should be ignored and that the real way forward has to be digital storage. CD-ROM players such as those from Next Technology are available now and can hold around 600M of data or 1875 frames of uncompressed 320k screens (double this number in mode 15). This would provide a mere 75 seconds of play back time but, with data compression, this can be increased many times over. One of the main problems with this technology is that CD-players only transfer data at a rate of 150k per second and so the compression needed to move even a mode 12 screen of 80k, 25 times per second requires data compression of about 14 to 1. The reason for using existing CD-technology is, I guess, that there are so many of these devices and discs being manufactured that the cost is kept down. Phillips are working on CD-I (compact disc interactive) which, they hope, will enable fully inter-active systems to be on sale late next year. One way to get round the data transfer problems, is to use only a small window on the screen for the moving pictures but this is really not acceptable in the long term.

DVI

Another technology which is more generalised, is based on some specially designed Intel processors and is called DVI (Digital Video Interactive). The DVI boards are add ons to an existing PC and perform all the data compression and transfer to the host system. DVI should be capable of compressing high quality video films to as little as 5k per frame, in most cases, which will be more than adequate to get round the data transfer problems. As far as I am aware, DVI is not likely to be a commercially available product at prices the average user can afford until the mid-90s.

The snag with both CD-I and DVI is the need for additional hardware and processing facilities which will put the price up. If only we had a 100 MIP processor (ARM 5 or 6?) we could get the Archimedes to do all the work and the rest would be software and storage. Perhaps not an impossibility but, if we want full screen interactive multi-media now, we can use analogue laser vision type discs with genlock, or we can use the computer itself on a smaller scale with tools such as Euclid, Genesis and Next Technology's CD-ROM.

In future columns, I hope to look at some of the tools which are available to help the user work in the multi-media development of the Archimedes. In particular, Genesis II looks to have enormous potential. If any manufacturers or software suppliers are producing products and materials which are related to the multi-media field, I would be glad to here from them (or about them, from people in the know). I have also had the odd enquiry about training and help with RISC-OS and DTP. If there is a need for this I might be able to do something about it, so drop me a line if you are interested.

1 Melford, off Buckingham Road, Tamworth, Staffs
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(As with the other regular columns in Archive, this will live or die largely by the amount of feedback Ian gets on the subject from Archive subscribers. So do take Ian up on his offer and drop him a line. The same is true of the new Econet Column which follows this. Ed.)

Base
5

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Econet Column

Neil Berry

The first instalment of this column will not deal with any specific problems, but will act more as a general introduction to the subject connectivity between Acorn machines.

Why Econet?

Everyone who has worked in a environment with more than one Archimedes must surely, at some stage or another, asked themselves whether it wouldn't it be possible to connect them up. This could have been for a number of reasons, not least of which is the desire to have a common bank of software, which is available for all of the users on the system. Another reason for using a network is the possibility of using a simple electronic mail system, and perhaps a viewdata system.

Until quite recently, this would have meant investing in Econet, but there are now available a number of different options for the potential networker. The main system, and what this column will mainly be based upon, is the Econet system. Even so, there is a choice as to which Econet system you should choose. Acorn and SJ Research are the two main contenders in this market. Both of these systems offer very similar packages, and the question really is not which system to opt for, but whether you actually want to invest in a full blown Econet system at all or whether you should go for a different method of connecting up. In nearly all situations, the primary concern is cost, and at over £2000 for an Acorn fileserver and approximately the same for an SJ MDFS (Modular Disc File Server) with 42M expansion case, you need to be absolutely sure that Econet is for you.

Other systems based on the same physical interconnection which have become available more recently include Nexus, a hard disc sharer which operates for a number of local machines. A similar system is offered by Software Solutions which a disc sharer which installs itself as a multi-tasking RISC-OS utility and allows users of BBC micros and Archimedes to access the hard disc of another Archimedes over the Econet. Both of these systems offer very good performance and cost effectiveness, but are both more suitable for small numbers of computers being attached to the same local hard disc. For systems which require the networking of a larger number of machines, perhaps in a school where the distances between computers are also perhaps greater, then a conventional Econet system is the only real solution for Acorn machines.

Connecting up

Leaving aside other systems and concentrating on Econet, what do you actually need to begin to connect up your computers and how much is it all likely to cost? A typical system, perhaps in an educational environment up to 500m in length, might consist of perhaps 20 Archimedes computers, and 20 Master computers. To connect up these machines using the most basic Econet layout would require 40 Econet modules, two EO1S Filestores, two E4OS Filestores, one E6OS Filestore, five 100m reels of cable, 16 socket packs, one Econet starter pack and two printers of the user's choice.

The above system may seem very large to some people, but the ideas behind it can be applied to any size of system. All of the above items would cost a staggering £43,100. This price is slightly unrealistic, in that our hypothetical school would almost certainly already have the computers to connect up. The price simply for connecting up the computers would be £6600. This is still a lot of money, but it is now more within the reach of educational departments. It is not, however, only educational establishments who use Econet systems; some business users also have a vested interest. This group of users has always had the problem that their Econet system could not be connected up to any of their 'Industry Standard' machines or networks, but this is rapidly being changed by Acorn.

The future

For education, Econet looks as if it's here to stay – at least for the forseeable future – unless there is a significant change in governmental policy and/or a change in technology. For more general applications, Acorn have placed themselves firmly in the Ethernet/Unix market. This seems to be the way forward, as it is now apparent that MS-DOS, even if run on 80386 machines, is not suitable for modern computing in terms of speed and its single-tasking capacity. Acorn have made provision for DOS emulation but the situation will arise soon that PC emulators will be able to run DOS, faster than 286 machines running DOS in native mode.

The release of TCP/IP (Transmission Control Protocol / Internet Protocol) package by Acorn, now means that Acorn Archimedes machines are able to communicate with a Unix network, via a RISC-OS application. Acorn have already stated their intentions with their R series machines, but this has now been re-inforced by the release of TCP/IP. Acorn are leading this field at the moment but they must realise that, now that they are in an open market situation, fierce price cutting may now ensue from computing giants such as IBM and DEC. Acorn must be prepared to follow or get left behind.

If there are any people out there who have developed Econet products, I would be particularly interested to see them and, who knows, you might get a bit of free advertising! Many thanks to all of the people who have written to me. I am unfortunately unable to reply to all of the letters, but I do read and appreciate them all. If you send a disc with your letter on, could you please send it in ASCII format, to make it easier for me. Just as a reminder, I am at 21 Pargeter Street, Stourbridge, West Midlands DY8 1AU (no phone calls, please) and would be pleased to receive hints, days in the life of Econet, programs, ideas or just requests for help.

Hostages

Chris Furlong

"An urgent phone call from the National Security Minister... an Embassy has been overrun by terrorists. As Head of the Terrorist Combat Squad you are in control of all operations." So the introduction on the back of the box states.

As head of the anti-terrorist team, firstly you have to place your crack marksmen in buildings, but you have to avoid search lights and the terrorists deadly aim. You do this by running, crawling, rolling and hiding. The places where you have to place your marksmen are marked on a map of the embassy which can be accessed when all your men are in hiding. If all your snipers are killed the game ends.

You are then shown your three DIC (Direct Intervention Combat) men absailing from a helicopter onto the roof of the embassy. The next stage is to position your DIC men at points around the embassy roof. You then have to enter the embassy via the windows. This is where your snipers help, you can use them to shoot the windows, thus making entry slightly easier. Watch out for terrorists at the windows, you can kill them.

To enter via the windows you have to position your DIC men outside the windows and swing out. This is quite hard as you have to swing out and start descending the rope at the right point. This is done with the aid of sound effects – if you release him at the correct pitch, all is well and he will enter the building. The embassy has three floors and the ropes are only two floors long(!) so falling too far will result in the death of your DIC man.

Once in the embassy, you control one man and explore the rooms on each floor. There is a floor map displayed on the screen showing your position, that of the terrorists and the hostages. All the hostages must be rescued and taken to a room on the third floor. If you are killed while leading hostages, they are killed as well. You do not need to kill all of the terrorists.

After you have rescued all the hostages you are shown the front page of a newspaper which has details of your success or disaster.

The graphics and sound in the game are excellent, especially the loading screen which is animated. The scream as your abseiler falls off his rope or the shout of 'GO' as you leap out of hiding are very realistic. The game has three main levels of difficulty (Lieutenant, Captain & Commander) and four different time limits (the ultimatum).

Conclusion

The game play is great, offering both mouse and keyboard control and a wide selection of difficulties. This will keep the kids quiet for hours – and adults as well.

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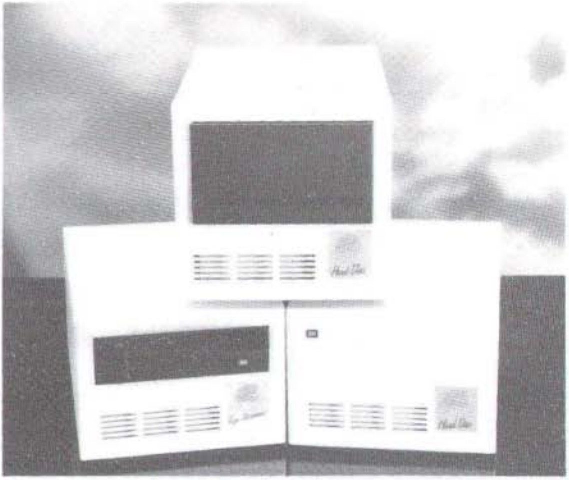

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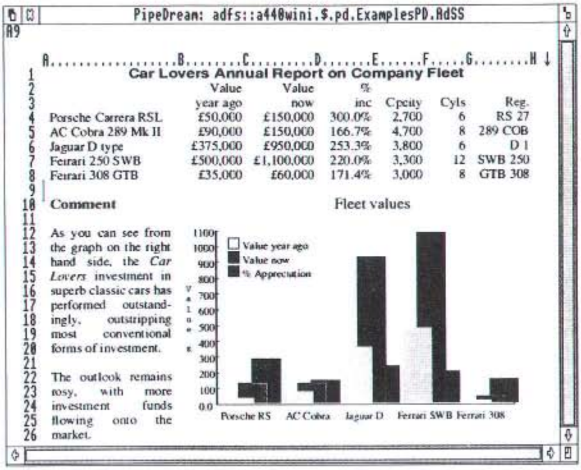

Car Lovers Annual Report on Company Fleet

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Comment

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Mountains, Euclid, ArcLight etc

Jim Markland

As a 'geological engineer', I am frequently involved in the handling of three or even four dimensional data sets. These data sets can result from the collection and processing of real data (e.g. topographical) or the results of mathematical simulations. This has led naturally to an interest in the class of graphics which can help visualise such data sets in a meaningful way. A consequence of this has been the realisation of the potential of the Ace Computing's Euclid family for this purpose and the adoption of the Euclid file format as a standard for 3-D graphics.

Geological or geographical data is rarely conveniently arranged in its original state and frequently requires some form of interpolation onto a regular grid in order to facilitate processing. A variety of methods exist for this purpose. Two such methods in common use are the Inverse Square Distance approach and Kriging. Having derived a matrix of data points, one may then plot, say, sections and contours. Sections may be parallel to principal axes or possibly drawn along an arbitrary trace on the map (the route of a road, for example). Contours may be shown as line drawings or coloured, dashed or hatched in some way to indicate principal contour intervals or increasing elevation. For this type of work 2-D vector graphics are appropriate and I have adopted the DXF file format as a standard. This is compatible with !Draw at a basic level (although there are some minor mismatches). Vector plots can be complimented by the use of sprite files where fancy colour fills are required and, either way, the results can be reported using a DTP package.

Thus far we can achieve the traditional visualisations of a three dimensional surface within the two dimensional confines of !Draw and the printer paper. How can we improve on this?.

At the 'wireframe' level we can plot contours or surface patch boundaries as an isometric and maybe we can extend the colouring of inter-contour intervals to indicate increasing elevation. We can draw sections once more; this time several at a time displayed spatially to show their true relative locations. Again, these may follow the principal horizontal axes or some arbitrary trace; vertical sections plotted along contour lines being one such aid to visualisation. As an alternative, contour may be blocked out within their horizontal planes. Surface patches may also be plotted and the fourth dimension may be added using colour to signify some other variant such as vegetation or surface temperature. Throughout, perspective and hidden surface removal techniques may be required to aid the visualisation.

Not only may such images be presented isometrically but the objects so created may be rotated and viewed from different directions. Animations may be added to present a sequential range of viewpoints. In doing all of these. we have moved from the 2 dimensional world of !Draw and the printer page to something much more interesting and more demanding of video technology.

For this work, I have chosen to use the Euclid editor and its friends. Euclid, as many already know, is an extremely fast integer based 3-D editor which performs object transformations and all the other basic functions required for this type of work (object intersections, hidden surface removal, etc). It is the centre piece of a number of three dimensional graphics packages from Ace Computing and has its own, proprietary file format.

The files are very compact and support a wide range of primitive shapes although, I regret, they cannot be read by humans. (I believe that Ace Computing may be thinking of including 3-D DXF files into their system.) The packages concerned are Euclid, Mogul (for 3-D animations: Tween is available for 2-D animations based on !Draw files.), Projector and Splice. What is also interesting is that there is an increasing number of packages from other sources which use the Euclid format (e.g. Genesis and my own !Contour). Elements, the Euclid user group provides useful extras and demos.

Having arrived at the point where one can produce and animate many, if not all, of the above types of image, attention turns to the question of multiple surfaces. Partially transparent surfaces permit multi-layered objects to be visualised (e.g. stratigrapy) but generally require raytracing to achieve this. My own experiments with this, using the MTV raytracer, coincided with the arrival of yet another product from Ace: Arclight. Arclight completes Ace's hand of 3-D packages which together give the user of these a very powerful combination of 3-D editor, raytracer and animator.

Some of the demonstrations I have seen which, I believe, have been prepared using Arclight, are very impressive indeed, although I suspect that those who inhabit the abstract world of Render Bender's regular shapes may have comments on this. (Arclight treats all surfaces as a group of polygons and does not, at this stage at least, use polygonal patches – nor do any of the demos I have for the MTV raytracer for that matter).

For those not familiar with raytracing, I would recommend a previous article on the subject by Malcolm Banthorpe. Arclight runs under the desktop and is astonishingly fast, using a recently published voxel approach to raytracing. Menu selections give the user much control over the process. One of Ace's achievements with it is to perform image decompaction in real time during animation playback. This is truly impressive.

Most, if not all, raytraced images I have seen on the Archimedes have been done for aesthetic reasons – to produce a pretty, and sometimes stunning, image. This, of course, is not what is required for the application under discussion. Instead, the raytracer is required to allow partial transparency permitting the visualisation of several surfaces/objects simultaneously while retaining the ability to discriminate between the objects. This approach requires materials with a refractive index of one and Arclight permits the definition of such arbitrary material types. Arclight's patch approach to surface definition is no drawback.

Unfortunately, the version of Arclight I have received for review seems to have problems with material selection, although I suspect this may partially result from a combination of operator finger trouble and my persistence in describing surfaces rather than solids. A little more work is required here to achieve the results I require.

In pursuit of my goal, which is to model 3-D surfaces in a variety of ways, I have adopted the Euclid file format as a standard and am very happy to recommend this to others. The question of file readability I have overcome using my own intermediate format in conjunction with a small conversion program. This aids data input from other computing platforms. How long before DTP packages include Euclid file inputs?

Tony Cheal's work (he is the 'Ace') is very impressive… no… formidable! This is the kind of stuff that sells computers. (It is the graphics which will sell Mathematica – if that is what you want, why pay so much when you can use Euclid?!). Ace deserve much success with this family of codes. A

Ballerena from Sisteme

Richard Rymarz

Much has been made of the Archimedes 'Kiwi' connection and even the 'Dutch' connection. Well, here is the 'French' connection. Sisteme, a team of French programmers, has produced a first rate variation on an old theme. 'Breakout' and its numerous offshoots have been with the BBC Micro scene since the early 80's. Now comes this most recent and easily the most interesting version which has had my 13 year old son and I glued in front of our VDU for longer than I dare admit.

There is no spurious storyline to mar what is basically a shoot-em-up game that has a variety of colourful and different shaped bricks to knock out. The authors claim ray traced, digitised and bit mapped graphics. Who am I to argue! Suffice it to say that the whole scenario looks extremely professional. 256 colours, 376 different types of bricks, 19 monsters (so it says on the packaging) and 28 bonuses, add up to action packed screens.

But what makes this game really special is that instead of your bat moving along the bottom of the screen in time-honoured fashion, it now moves in a complete arc so that the bricks can be attacked from any direction. In addition, there is a two player option. Two bats can be employed at one time encouraging a team effort or a competitive game (as well as warding off cries of being anti-social). It is this game play that makes 'Ballerena' so addictive. The 'let's try just one more time' syndrome rears its head strongly.

The usual Brick-up bonus features are all there: lasers, split bolts, sticky bats, double size bats, large and small bolts, stop balls, number bonuses, move to next level bonuses and so on. There is also a challenge stage after every four levels when your bat is armed with a laser. 64 levels are available but I have only reached level 20. Keys are definable, mouse or joystick can be used, the game can be paused and there is a password system.

If all this were not enough, the sound is amusingly employed. A respectable musical sound track accompanies the game throughout, though this can be switched off, and the various crashes and bangs are nice enough. What I especially like is the use of speech. "Mama Mia" can clearly be heard ever time a life is lost. The two player option has two voices and caused some laughter when they both cried in harmony. "Four, three, two, one," and other words (with a French accent of course) add an attractive aspect to the game.

The only criticisms are minor niggles. The high score table is one favoured in the arcades where initial letters are used by scrolling the alphabet – why not just a simple tap from the keyboard. Secondly, if a game starts with the wrong key or player option then you cannot quit until all lives are lost; and finally, the first four levels seem more difficult than the next sixteen.

All in all, 'Ballerena' oozes class, is a must for 'Breakout" freaks and is highly recommended for everyone else. I look forward to the next effort from this talented French team. A

Hardware Column

Brian Cowan

Ian Copestake Software IDE Drives

Last month, I told you that I had received an IDE hard disc drive from Ian Copestake Software. The release of these drives for the Archimedes had been much publicised and I was eager to see how they fared in practice. I had advised some people to delay purchase of a hard disc until the IDE drives were released and I had had a good play with one. For some this delay will certainly have been worthwhile.

What is IDE?

IDE stands for Integrated Drive Electronics. The idea is that the drive already contains most of the electronics needed for interfacing. Since this is standardized, it should result in a significant reduction in cost; and it does. If you look at adverts for hard drives, you will see many interface standards offered. Archimedes users are most familiar with what is called ST506, the interface which is catered for by the standard ADFS filing system. For those graduating from ST506, for which the ADFS cannot support drives of a capacity greater than about 60M, the usual system used is SCSI, the Small Computer Systems Interface.

To understand the significance of IDE and where this stands in relation to the other interface standards we must look at its other name. These drives are essentially the same as what are called AT bus drives. That is, they connect almost directly to the sixteen bit expansion bus of the IBM AT computer. This is why such drives are likely to become very popular in the future and it is therefore a brilliant idea (IDEa?) to enable them to be used on the Archimedes system.

Speed performance

Very roughly, one would expect IDE drives to give the same sort of speed performance as the corresponding SCSI drive – usually the same drive mechanism is sold with either SCSI or IDE interface electronics. I found the drive I was using to be quite fast in operation. I decided, however, that speed tests were inappropriate. The IDE drive I was using had a capacity of 200M. I had no SCSI drive of similar capacity to compare it with, and certainly not one of identical mechanical construction. However, although IDE and SCSI are likely to be of similar speeds, they will generally be faster than the old ST506. (Paul is hoping to start stocking the IDE drives, so I'll get him to do some comparitive speed tests.)

Price advantage

I looked through some computer magazines to get an idea of the comparative prices of different sorts of drives. As a very rough "rule of thumb", each ten megabytes costs about £50, although the figures tend to fall for the larger capacities. Comparing an identical IDE and SCSI drive, the IDE device is usually about £100 cheaper. So this is the sort of price saving concerning the disc drive alone.

But now we must consider the cost of the interface card. For an AT computer, a very simple interface card is used which simply does some address decoding and possibly some line buffering. One would expect to pay between £20 and £30 for such an interface. The corresponding SCSI interface card would cost perhaps £200. So for a PC (AT) the cost saving can be considerable. For the Archimedes, the Copestake IDE interface sold separately, costs £126 including VAT. This seems a little expensive, but as well as the address decoding and buffering, this interface contains the IDE filing system firmware in a ROM. For comparison, the Oak SCSI interface would cost about £220.

Looking at the comparative costs for drives and interfaces specifically for the Archimedes computers, the following table gives some figures:

Capacity	Oak SCSI	IDE drive
80 Mb	£720	£574
200 Mb	£1310	£1034

The savings are quite convincing, particularly at the top end.

Installation

When I installed the system last month, the instructions were not available. As I said then, the actual procedure was quite trivial. I screwed in the drive, plugged in the interface and switched on. That was all there was to it. The IDE icon appeared on the icon bar and I was in business. You have the choice of either using a backplane socket or not. The interface card is so small that 310 owners in particular, can plug the interface card directly into the expansion socket on the main PCB. However, if a backplane is used then it must be of the four-layer variety (Acorn or I.F.E.L.). Evidently, as with SCSI, the timings are sufficiently critical that a cheap two layer board will not do.

One surprise was the disc "busy" indicator LED: it stays on all the time, but glows brighter to indicate disc action. This is done purposely as it obviates the need for an extra indicator on the front panel of the computer. The idea is that this indicator replaces the power LED installed in the computer, so that no new front panel sticker is required. I understand that later versions of the interface will have a dual colour LED so that the colour actually changes to indicate disc drive activity. This is a neat solution.

In use

There is not a lot to say here! I have used the drive extensively now for a few weeks and almost everything was perfectly straightforward. This included running the PC emulator with a DOS partition, copying large files both within the desktop and from the command line.

A3000 internals

There are also internal drives for the BBC A3000 computers. I saw one of these at a recent exhibition, but I have no experience of actually using it.

Conclusion

So what are the pros and cons of these devices? The price of the drives is low and I think there is potential for cost reductions in the future. Also, the speed performance is good. If you own a 300 series machine and you don't have a backplane and you don't plan on having any other peripherals in the future then these are definitely the drives for you. If you have a 300 series machine with a (four layer) backplane or a 400 series machine and you are not contemplating adding any other mass storage devices then, again, these are probably the drives for you.

On the negative side, you can only use a maximum of two devices on an IDE bus and the choice of other devices is presently rather limited. It is possible that in the future there will be tape streamers, magneto-optical drives and possibly WORM devices. But we must wait for these. So, if you are using or planning to use, some of these other devices then it might well be that SCSI, with the extra expense, is the better option for you.

So, all in all, these are good devices at competitive prices. If you want the added versatility of SCSI then you must pay for it.

DIY 540 Machines

Yes, I have finally got my new Archimedes 540 microcomputer. I went to the Atomwide headquarters in Orpington to collect it last week, and quite excited I was too. There was the box waiting for me, just like any other Archimedes packing case, except that it said A540 on the outside, serial number 50. The box was sealed with a label boldly announcing Quality Control Tested by ZCL PLC Technical Support. Now this is just the sort of thing to inspire confidence in the doubting public – I was most impressed.

In last month's Archive I read about the only other 540 in the hands of a member of the general public (to my limited knowledge). This turned out to be faulty and had to be changed. Well ZCL's Quality Control was going to save me from that sort of problem. Or so I thought…

Martin Coulson, the Atomwide supremo, suggested that we try the machine out before I took it away – reluctantly I agreed. We unpacked the case, connected the computer up and switched on… and… nothing! Well, not completely nothing. A "desktop" appeared on the monitor, which wobbled all over the place and an error message came up asking where the keyboard was. We checked that the keyboard was plugged in and we even tried another keyboard, but to no avail!

What an anitclimax! I was so looking forward to my new machine and it turned out to be "dead on arrival" but Martin adopted the positive approach. We got the circuit diagrams out and took the machine apart. Fortunately the main constituents of the ARM chip set were easily accessible and we looked for a likely culprit. Since the picture was so wobbly our first suspect was the VIDC chip. Replacing it made no difference, so we then turned to the IOC. On replacing this, the machine booted up properly, with a respectable picture – a repair had been effected. I was lucky. However I don't think that the man in the street buying from the usual sort of supplier could be expected to commission their machine in this DIY manner. Had it not been for Martin Coulson's help and facilities, I would have been a sad man indeed. *(That's interesting! One of the A540's that we supplied recently has an identical series of faults. Now I know how to clear it, hopefully! Ed.)*

Monitor and a half

In respect of this recent purchase, Martin's other achievement was to persuade me to buy an Eizo 9070S monitor. This is a hulk of a monitor with a sixteen inch screen – and what a difference. With the Atomwide mode extensions module, you get a beautiful picture in mode 102. This is a 1152x448 sixteen colour mode, and it makes the older type of monitors appear prehistoric. You have a massive screen area, all crystal sharp, permitting many windows to be open while appearing completely uncluttered. The clincher for me was seeing an Impression document with many fonts used. This was razor sharp at 100% size, while still leaving a good screen area for other tasks. Unfortunately, this sort of monitor is not cheap, but hopefully in the future prices will drop. Incidentally, the monitor can be used with the older 400 and 300 series machines if the Atomwide VIDC enhancer is used. But note that even with the 540, Acorn's firmware only supports a very limited number of screen modes. For realistic use, you must have the Atomwide mode extender software – Atomwide provides this free with monitors they supply. Thanks Martin, good service all round. *(We use a couple of 9070's in the office and would agree with Brian's comments. Ed.)*

Inside the 540

The machine comes with a four slot backplane installed, as do the 400 series machines, but this backplane is different. It plugs into the main board on the left hand side (looking from the front) – the opposite of the 400 and 300 models, so unfortunately the backplanes are not interchangable. Also, the upper left hand slot is occupied by the SCSI interface (a standard Acorn SCSI interface, mark two). Also, it comes with an extremely helpful manual and a utility program called ScsiDM. The interface has the standard IEEE-type connector (like a longer version of the Centronics printer connectors) rather than the simpler IDC connectors of the rival interface card manufacturers. This interface comes with a line termination plug – no skimping here.

As I mentioned in a previous article, the ARM3 chip is on its own CPU board which plugs in just behind the backplane card. The ARM3 CPU is the older style construction with pin lead connections rather than the surface mounted devices now used on the Aleph One ARM3 upgrades. The CPU is soldered in to the board, and so one wonders exactly what will happen when the Floating Point Accelerator comes along – but this is still probably a long way off.

Hard disc

The hard disc supplied with the 540 has a 100M capacity. This seems a reasonable capacity, considering the power of the machine. Of course this makes backing-up much more of a chore, although also much more necessary. The 40M disc of my upgraded 410/1 machine was just about full and I was able to copy everything over using my 20M Cumana Floppies in two goes. This took some time but it all went successfully.

After changing various references from ADFS into SCSIFS, most programs and applications ran first time. The main exceptions were some games which used screen modes as yet unsupported by the mode extender. For some reason, I was unable to install the PC emulator on the disc using the usual installation procedure, but when simply copied over from the old machine it worked perfectly.

Floppies

Notwithstanding the current festivities, you will get the impression that it is all moans from me this month. I know it will make some of you green, but as well as my new 540 machine, I have purchased another two 440/1 computers in the last few weeks. Well after a few days, the floppy disc drive in one of them packed up. I could hardly believe it was the disc drive which was at fault, but replacing it with another (very old) one reduced our immediate problem. Then on the Friday afternoon before Christmas just as I was going home, someone rushed out after me to say that the other machine had packed up. Yes, again, it was the disc drive which had packed up. What on earth is going on?

Acorn seem to have the knack of picking up "duff" lots of various things. I hope it is not the case with all the new floppy drives. I still have an embarrassing grave yard of Western Digital 20M hard disc drives which all seized their bearings after about one year of usage. Incidentally, the first 440 which I purchased, which has a Tandon 20M drive is still going strong – and that was one of the very first 440's in circulation.

DTP and more

I want to end on a happy note and I can summarize this in two words: Computer Concepts. The hardware angle on this has to be the dreaded dongle, about which more later. I have been using Impression now for a few weeks and I am quite staggered by its quality and versatility. I had a brief flirtation with Acorn DTP – this caused me to run a mile and I thought I would never touch DTP again. But Impression has changed all that. I am just full of admiration to the programming team who have developed the product and I can see I shall be using it a lot in the future. Its main let-down, I think, is in the manual and in particular the index. It seems to me that at last we have overtaken the Mac's in their only remaining stronghold. What do you think Paul?

(I'm still intending to make the change eventually but it's a big decision to make – each month follows the previous one with amazing regularity and rapidity and we are already behind schedule because of moving offices and having had time off at Christmas. Anyway, if next month's magazine is even later than this one, it may be because we have become the first Archimedes magazine to be produced entirely on an Archimedes. No, Risc User doesn't use Ovation – it's produced on a Mac! Ed.)

And coming soon from Computer Concepts is Equasor. I have been using various pre-release versions of this and I can quite definitely say that it fulfils all my requirements in constructing equations. In many respects it is uncanny, in that it seems to know what I want to do next before I have actually made the decision. I feel sure that this remarkable product will satisfy the requirements of mathematicians and physicists.

Dongles again

After my last tirade against dongles, I received a letter from Charles Moir of Computer Concepts. He explained the need for protection of his company's software and asked if I had any better alternative to dongles. To my mind the best solution to the problem of software piracy is that adopted by the Borland company. They sell their wares at reasonable prices and they include high quality manuals. If the manual is properly bound and produced in colour then it is very difficult to photocopy. This means that possessors of pirate copies of the software who wish to use it seriously will buy a legal copy essentially for the manual. Failing this sort of solution, I reluctantly agree that dongles are probably the least problematic of the various other methods of protection. However, I am now using WorraCAD which also has a dongle and the situation is rapidly getting out of hand.

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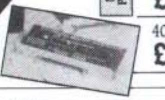

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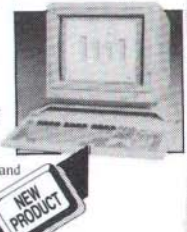

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The Art Machine

Hutch Curry

The Art Machine software was produced for an art exhibition of the same name organized for children. The exhibition was designed to allow children to participate in, and thus get excited about, art. The software is now available in two packs of five programs each (four discs) for use in the schools or at home. The software in one of the packs has been produced by Topologika, the other set comes from a company called Central Software. Both packages come with the same booklet entitled 'The Art Machine Pattern Book' and the pack from Central Software contains a double-sided A4 sheet of instructions for each program. The Topologika pack that I received had no instructions at all.

The supplied booklet looks as though it was produced for the art exhibition itself rather than as a manual for the purchased software. This results in a more general and less technical introduction to the content areas of the programs, but in my view, this does not provide sufficient information to be useful as either an introduction to the programs or to the subject matter – which is essentially geometric art. In its favour, the booklet does include a lot of colour screenshots from the programs and provides ideas and worksheets for things to do away from the computer. On a distinctly negative side, the booklet is printed in a format called 'tumble book' which means that there are two front covers and no back cover. The two halves of the book are printed in different vertical orientations. This I found very frustrating to use and could see no benefit other than novelty value.

Before briefly describing each of the programs, there are a number of general points that should be made. On the positive side, the programs are generally enjoyable and easy to use (even without instructions). In some of the programs, there is an on-line context sensitive 'Help' facility that was very welcome. The intrinsic interest value of the programs was variable. I imagine that some of the programs would keep young children interested for hours while others would receive only cursory attention. There is a also large difference in the quality of the software in the two packs – the material from Topologika in pack 1 was much slicker, better presented and looks as though it might have been written for the Archimedes (under Arthur). The material from Central Software would have looked quite at home on the BBC Master or IBM PC (with CGA). None of the software in either of the packs was multi-tasking. Not only was the software not multi-tasking, but it failed to follow Acorn's guidelines for programming technique, use of system resources and so on. This, I expect, was done partly to make it easier to use for single disc drive users. However, this act of consideration to their major expected marketplace (A3000s in schools) makes it unnecessarily awkward for those fortunate enough to have a hard disc.

Although printing was accomplished with the Acorn-supplied printer drivers, I found that I had to resort to an earlier version of !PrinterDM for printing to be successful. Once the printer was working I then found that the choice of colours in most of the Topologika software was not geared to clear grey-scale output so the results were very disappointing. The other extremely annoying feature of all of the Pack 2 programs and one of the Pack 1 programs was the inability to exit the programs and return to the Desktop easily. For these programs it was necessary to reset the computer. The Topologika software uses the mouse as input device but there is a Concept Keyboard version available. The Central Software pack provides for input from either the keyboard or mouse.

Software Pack 1

Snowflakes

This program is an exploration of fractals using Snowflakes as the central theme. The user has a choice of nine shapes to start from. These range from a triangle to a seven-pointed star. After the selection of a shape, the user has to choose one of four transformations which will be applied to each of the straight lines in the original shape. The available transformations are two square and two sawtoothed waves. These transformation patterns can be further altered by the user for a greater variety of effects. When all the options have been chosen, the user can initiate the transformation and observe the effect on screen. The transformation can be applied recursively although after the third level, the time taken gets excessive. When the user has finished with a pattern it can be saved to disc and/or printed. All in all, I thought this program was quite good and would expect that children would explore the options quite fully before losing interest.

Cyclic Story

Cyclic Story is a program for making short animated films that can tell stories that seemingly do not have a beginning, middle or end. The program works by linking together very short animated sequences according to the user's interest. The program is very limited in that the only material that could be incorporated in the stories was the 27 supplied files which fell very strongly into five themes. Furthermore, despite the title of the program, the supplied files have strong linear and logical relationships which greatly constrain the way in which the sequences can be combined. However, the graphics and the animations that are included are generally excellent. There is provision for storing the film sequence on disc and for printing individual screens. I think that children would greatly appreciate this program for a short period of time and then get bored and frustrated with its limitations.

Patterned Tiles

This program was designed to allow children to explore easily the way in which very complex patterns can be constructed from very simple units – tiles. The child first chooses the set of tiles to use from the 8 provided (or constructs his own). The child must next choose the colours (two from a choice of seven), the size of grid (3 x 3 to 18 x 18) and whether the tiling should be manual or automatic. Manual tiling involves choosing for each cell the tile you want and its orientation. I found this quite tedious for any but the smallest of grids. By contrast, I thought that the automatic tiling was superb and made this program my favourite in Pack 1. The automatic tiling is done using rules to determine which tile would be placed in which cell and in which orientation. The rules are expressed as mathematical expressions using the X and Y cell positions. Provision is made for both printing and storing on disc the completed patterns.

Moving Squares

'Moving Squares' is another animation program and is a very enjoyable way to explore geometric rotation and translation. The central idea of the program is that the user can construct films made up of short animated sequences. The sequences are constructed by choosing the following: one of seven shapes, one of sixteen colours, the starting size of the object, the initial rotation and the starting position on the screen.

Following this, the user must choose at least one of three transformations to apply to the object. These transformations are: change in size, slide across the screen and spin. For each of these transformations, there is a selection of options appropriate to that particular transformation. After these selections, the user has to decide whether the sequence will leave a trace or not and how many steps to perform the movement in. The movement is then animated on the screen. A number of these sequences can be linked to construct a longer film. The films can be stored on disc and the final screen can be printed.

Fractal Trees

Like 'Snowflakes', 'Fractal Trees' is a program intended to introduce the concepts of recursion and fractals to children in a fairly enjoyable fashion. In this program the children design their own trees. To do this they must choose the following parameters: the season, the position of the tree, the height of the trunk, the angle from vertical, the number of recursions (years of growth), the annual growth rate, the density of branches, the leaf density and, for each year, the spread and number of branch divisions.

After making these selections the tree is 'planted' and the child can watch the tree 'grow'. Multiple trees can be drawn on the same screen and screens can be saved to disc and/or printed. I think that the number of physical parameters that can be varied would ensure that the inquisitive child would spend substantial periods of time with the program and would hopefully start to appreciate the nature of fractals.

Software Pack 2

Weave

This program is designed to allow children to experiment with the geometric forms and patterns associated with weaving. The child is first given the choice of 'strip' weave or 'thread' weave which actually just provides different maximum and minimum values for the number of horizontal (weft) and vertical (warp) stripes. The actual number of threads to use is next selected, followed by the selection of one of seven colours. The child is then given the choice of 'manual' or 'programmed' weaving. In manual weaving the user starts at the bottom left corner of the design and can choose to weave the weft over or under the warp and can alter the colour of the weft. After selection, the weave is made and the next location can be specified. In programmed mode, the user can set up a number of rows with preset patterns to speed up the weaving process. The entry of these automatic patterns is quite easy and makes the operation of the program less of a chore. Finished screens can be saved to disk or printed.

Tracks

Tracks is a computer spirograph that allows the user to specify the starting X and Y co-ordinates, the speed of pen movement, the degree of damping and the amount of 'squash'. By varying these parameters it is possible to make some very interesting patterns and to start to appreciate the effect of the physical variables on the spirograph operation. Although this program was the most attractive and well written on Pack 2, I thought its interest to children would very quickly wane.

Tiles

This program allows children to design two-coloured tiles that are then laid on to the screen. These completed patterns can then be saved to disc if required. The tile design starts from either a triangle or rectangle. There are two each of these shapes that differ in the number of points that the user can alter. When the tile is formed the user has a choice of seven colours to choose for alternating tiles. The tiles are then placed on the screen to produce the finished pattern.

Bounce

I thought that this program was the most enjoyable on Pack 2. The concept behind Bounce is that of a ball of constant velocity moving at some angle within a chosen geometric shape. Wherever the ball goes it leaves a trace. The child has a choice of a square, a circle, a rectangle or a triangle for the ball to be constrained by. The child also chooses the number of bounces the ball should do, the initial start position of the ball and the angle of travel. By trial and error it is possible to produce some rather striking patterns and – more importantly – start to appreciate intuitively the effect of the physical parameters on the pattern produced. Completed patterns can be printed or saved to disc. One major niggle, in addition to the general remarks already made, concerns the very low resolution screen mode employed which greatly reduced the attractiveness of the display.

Pattern

This program is designed to allow children to form quite complex repeating patterns such as might be found in wallpapers or fabrics from smaller and simpler rectangular units. The smaller units are formed on either an 8 x 8 or 9 x 9 grid. The basic elements of the pattern are lines which can span any two of the grid positions. After adding all the desired lines there are options to reflect the lines to produce symmetrical patterns easily and to colour fill any enclosed areas. For both the original lines and the colour fill there is a choice of only seven colours. When you are satisfied with the pattern, you can then form the larger work by constructing either a 6 x 7 or a 5 x 6 array. These can be saved to disc and/or printed out. I thought that this program was one of the better ones on Pack 2 but it would have been so much more enjoyable if it had been written with the proper WIMP interface.

Availability

The price for each of the Art Machine packs (five programs in each) is £25.00 plus VAT. If you obtain them by mail order from Topologika you must include another £1.00 for post and packing. Alternatively, each of the Art Machine programs can be purchased separately for £10.50 plus VAT plus £1.00 for post and packing.

Conclusion

Although I enjoyed a number of the programs and thought the ideas behind most of them were very good, I would not fully recommend these software packs because they are not RISC-OS compatible. If they had been written as multi-tasking applications using the standard menu and filing systems, I would have felt more positive towards them. A

Jiglet

Roger Nelson

Jiglet is a response by 4mation to requests for a version of Jigsaw (see review in Archive 3.5) suitable for younger, and older less able, children. The package arrives in an A5 size folder and consists of a disc and a slim manual. Very sensibly, the software may be backed up, but only after the original disc has been initialised. This process, which must be done before the software is usable, only requires you to enter an ID when prompted, the software is then 'stamped' with your ID – as are any backups you make. You are allowed to make copies within a purchasing institution as the price includes a form of site licence. Well done 4mation!

Getting started

Once initialised, the software is accessible and fully RISC-OS compatible. It installs on the Icon bar and loading and saving can be done by dragging icons. One note here: once installed on the icon bar, double-clicking on a picture file does not load it but produces a message about the software needing 632k to load, this on a 1M machine. On a machine with larger memory it loads another copy of the program if there is enough memory available.

When a picture has been dragged onto the icon, the program operates in the same manner as Jigsaw (Archive 3.5). Obviously there are some differences. One is the number of pieces that the 'Jiglet' can be turned into; 4, 6, 9 or 12. Another difference is that the picture can be cut up into rectangles or irregular shaped pieces (these are the hardest) as well as jigsaw shapes. The number of pieces, the 'shape' required, the options of rotating the pieces and seeing a preview of the complete picture before placing a piece, are all selected using the mouse. When the 'Jiglet' has been created it is reassembled using the mouse in the same manner as Jigsaw, indeed the screen layout is exactly the same.

Differences from Jigsaw

This program has a different target group from Jigsaw, hence the new pictures which are aimed at the younger/less able child. There are sixteen very good screens provided and they are well graded from the straightforward to the more complex to complete. Printing of the screens is possible via Paint and the RISC-OS drivers (or other software) if you save a screen as a sprite rather than in the compressed manner of the program. The software also provides a third save option, that of a blank 'Jiglet'. This is a sprite which has the attributes chosen for creation of a 'Jiglet' e.g. 12 jigsaw shaped pieces, but no picture. When printed, this sprite can be stuck onto the back of a previously printed screen, cut out and then used as a normal jigsaw. If the provided screens do not suit, you can create your own by importing sprites from elsewhere, draw your own if you are artistic or get the children to draw their own – a good way to introduce an art package perhaps? A scanned sprite of Thomas the Tank Engine imported quite well, the program resized it to fit the screen with little loss of definition and despite it being black and white thrilled my four year old son. Now I've got to do some more scanning!

Consumer view

My son, who enjoys doing jigsaws, was the reason for volunteering to do this review. Being unable to read as yet, he needed instructions in how to use the program. Now that he knows how to switch between the number of pieces and the shape to use without dad's help, I am relegated to helping load in a new picture. For how long will I be needed to do that? When a 'Jiglet' is being created from a picture, he waits the short time without question; I suppose the words telling you what is happening are superfluous to him. Once the 'Jiglet' appears he selects the pieces, rotates them if necessary and reassembles the picture. The length of time he takes depends upon the grade of the picture but it's such an enjoyable program he perseveres until it is complete.

Documentation

One thing my son has no use for is the manual. This is concise and up to 4mation's usual high standard with illustrations where necessary and step by step instructions for certain sections. It contains a display of the available pictures and suggestions for extending the use of the software are included. There is even a mention of the National Curriculum with indication as to how the program can be of assistance when assessing 'attainment'. The manual has been printed on recycled paper – this does nothing for the quality of the paper but is a definite help to the trees of the world.

Overall

This program does what it sets out to do, providing jigsaw facilities which are accessible to younger children. There are plenty of pictures provided to keep a child busy and each picture can be completed at several levels by adjusting the options outlined above. A child easily learns how to operate the program, providing a stimulating way for a child to gain experience in the use of the mouse. The only problem I can foresee is having to purchase Jigsaw when the user becomes too good for the level of difficulty provided, maybe 4mation will arrange a trade in?

The software is available from Archive for £30. A

Language Column

David Wild

Now that I have re-read my previous editorial, I realise that I shall have lots of letters from indignant 'C' programmers pointing out just how good the language is. I shan't repent, though, as I was just expressing my own preference about languages for my own use – I have no doubt that many programmers write very good programs in 'C', just as they do in all sorts of language. I used to visit a computer club where we were convinced that one of the members used to dream in Z80 machine code! He would type in long sequences before most of us had even grasped what the aim of his program was, but it wouldn't be appropriate for most of us to emulate him.

We must never forget that programming languages, with the exception of languages like LISP, are for programmers and not for users. Our job is to provide programs that work, and also do what the user needs, and the major tests must be how well these conditions are met. Most users will not care what language was used and no user should ever need to know. Even professional software houses forget this from time to time: we have some programs on an IBM system/36 which can generate messages showing "RPG error 9035", and worry the people who are entering invoices because they know nothing about RPG. The message comes about because of a data entry mistake, but the programmer should have trapped it and issued a message appropriate to the activity.

Programmers do sometimes lose track of their own aims. In "The Psychology of Computer Programming" the author tells how he was called in to solve a programming problem and then found his solution criticised by the resident programmers for being slower than theirs. When he replied that his method worked and theirs didn't his argument was dismissed as irrelevant – speed was what mattered. While speed is sometimes essential, I feel that we should always work at trying to speed up a method that works rather than trying to change a fast routine so that it does what is needed.

The Archimedes is now getting some excellent software, written in all sorts of languages, and it is important to keep the flow going. None of it meets everyone's needs, but almost all the deficiencies are nothing to do with language but with program design.

Documentation

In the various reviews that I have written, it has often been necessary to criticise the documentation. I suppose that Acorn's LISP must take the wooden spoon for inadequacy but very few programs manage to match the quality of programming with that of documentation.

I suppose that this problem has been with us a long time and comes, at least in part, from mainframe days when every installation had its technical support staff who could interpret the manuals for those less fortunate. From those days, too, comes the tradition of a manual which is an alphabetical list of commands with no real explanation of the way in which they fit together. On many occasions, I have thought that if the British Rail timetable was designed like a typical computer manual there would be an alphabetical list of trains starting with the 0001 from Aberdeen and finishing with the 2359 from Ystradd Mynach and we would be told that "it's all in there".

Part of the trouble, I am sure, is that the people who usually write the manuals don't need them themselves. With both Cambridge Pascal and the Smith

& Wiggins extensions, I criticised the WIMP documentation and in each case the response was "oh, it's just a program that he wrote in half a day; it's as easy as that". While I have no doubt that the programs were written as easily as they said, the programmers had much more information than most of us.

The point of writing this is not to suggest that the people concerned were stupid, but to emphasise that the writing of good documentation, especially for those who know little about the subject, is very difficult. Just before I started to write this I was reading an article in "New Scientist" describing the writer's problems in learning to make use of a computer. In it, he points out that the beginners even needed to learn that the machine must be switched on before use. Within an hour or two this was "obvious" knowledge and you would forget that you ever had to learn it.

A further complication is that the difficulty of explaining is not related to the complexity of the subject but to the gap between what the reader already knows and what he needs to know. (Although a university lecturer needs to know very much more than a primary school teacher, I suspect that the actual teaching of something like calculus is easier than teaching small children to read and write!)

When you are writing a computer manual, you do not know who your readers are, and so you have to make some assumptions about what they will already know. At least the writers of classic text books could assume that there would be a teacher to help individual students with the parts that they found difficult. Now that software is so widely distributed, we cannot expect that the majority of users have access to technical advice.

An analogy with games occurs to me. If you are writing a program to play Noughts and Crosses, or even Chess, your documentation doesn't need to explain anything about the way the game is played; you can concentrate on telling the user how to use your program. For a game like Yahtzee, although it is played by people using actual dice, you will need more explanation as many potential users will never have seen it. With a game that is your own invention you will need to explain everything – including the aim of the game.

We can apply the same principle to other types of documentation. The Pascal, or Fortran, manual has no need to explain those parts of the language which are covered by the ISO standards; you can leave that to the textbook writers and get on with how to use the compiler. Things are different when there are language extensions. The standards don't cover them and most of the teachers won't know them either. Because of this, you need careful writing to give the user as much confidence with the extensions as with the standard language and this usually entails plenty of worked examples.

The WIMP extensions are a particular problem as most programmers are still beginners here, even if they have been programming for many years. Perhaps it isn't fair to put all the load on the compiler and language extension writers but they are probably, at present, the only people with the necessary experience. The other unfairness for them is that, as we all become more experienced with the WIMP, we shall wonder what all the fuss was about and forget the work that they did.

Object-oriented languages

One reader sent me a letter saying that I had missed out "Smalltalk" when I mentioned object-oriented languages recently. He's quite right; I forgot all about it. The only thing I've seen about it was a review which suggested that it was a slightly cut-down version. If any other reader is using it, I should be very pleased to have a report on the way it works and its advantages and disadvantages. Some of the ideas in Smalltalk seem to be excellent but I don't really know enough to comment further.

Pascal compilation

I have recently received from David Pilling a new application for compiling Pascal programs by dragging them on to an icon on the icon-bar. In general use, you drag the source file to the icon and a fully compiled and linked program, with the same name as the source file, appears in a sub-directory, called 'aif' of the current directory. You can then move this file, with any appropriate renaming, to wherever you want it. If you just wish the program to be compiled and not linked, when you are compiling a module, for instance, you can switch the link option off and just end with the 'aof' file.

The only snag with the program seems to be that it wants its "home-made" imports to be in libraries, rather than in 'aof' files, and I have raised the problem with David who has offered to look into it. At the moment, Beebug still have a few copies of the "Software Developers Toolbox", which contains programs for maintaining object code libraries, which they are selling at just under £30.

There is no problem with self-contained programs which are importing only from 'paslib', and he does offer another of his disks with a library of useful Pascal routines. The program works very well in practice and at £5.99 for each disk you can hardly go wrong! A

Shareware Disc Nº 33

Lenny Davis

The contents of this disc are split into three areas: Maestro 'Music' files, SoundTracker programs and tunes, and a couple of general utilities.

Maestro

There are twenty Maestro tunes, in three directories: Ancient, Astley, and Modern. Ancient contains seven classical pieces by Mendelssohn, Chopin, Schubert, Bellini, Ascher and Brahms. Astley contains six tunes which aren't documented but their names are AmerPatrol, CanCan, DrinkToMe, Duetto, HarmBlack and ShortSheba. Finally, Modern contains seven tunes by Sigmund Romberg including Foreign Legion, Fox Trot and Tango – not particularly modern but more so than the classical pieces. The two Schubert 'tunes' (Op 94 No 3 and Standchen) are my favourites.

Playing any of these tunes using the default voices is probably the worst thing you can do with them, particularly with just the internal speaker. This is not a complaint against the tunes, rather at Acorn's awful voices. Things can be improved by using alternative voice modules (none on this disc, I'm afraid), though the best results are obtained if you have a Midi podule and a Midi box or two. With decent sounds available, any of these tunes show off Maestro to good effect. Unfortunately, Maestro's Midi channel assignment (Instrument menu dialogue box) is global and is not saved as part of the Music file. So, if you wish to use Midi, you'll need to keep notes about channel and voice assignments. I admire the patience of the people who have entered these tunes into Maestro – a lot of time and effort was spent producing these files.

SoundTracker

The SoundTracker Player relocatable module has been available as a PD package for some time, though I personally haven't come across it until now. The programs on this disc are STmodmake V1.00, STracker V1.00, and TrackCTRL V2.00, all of which are RISC-OS multi-tasking applications, providing desktop front ends to the relocatable modules. They also each have !Help text files which are accessible from the menus in the usual way.

Before I describe these applications, I should mention that SoundTracker has been ported from the Amiga, which has sound capabilities similar to those of the Archimedes, though only 4-channel. A SoundTracker module is a data file containing both sound sample and tune data information for a particular song. This is in contrast to Maestro, which uses whatever sounds are available (as listed by *Voices). The limitation of four channels is not as restricting as it sounds, as modules may contain 15 or 31 voices. It sounds as though there's a bit of clever trickery going on somewhere.

Maestro's score display is nice but it does tend to slow the system down whilst playing – a good excuse for an ARM3. SoundTracker makes no attempt at musical notation, consequently leaving more processor power available for other tasks. Apparently, SoundTracker takes up about 25% of the processor bandwidth whilst playing, though running !Usage indicates a much lower figure. I auditioned the tunes provided (see later) whilst writing this article. The response of the desktop is slowed a little, though it is certainly a lot better than with Maestro playing. Try running !Usage with Maestro.

Once installed on the icon bar, either STracker or STmodmake can be used to play sound tracker modules that are dragged onto their icons. The difference between the two applications is that STracker has an option to display information about any module (song) currently being played, whereas STmodmake has a Splitter option. If this is selected then any Tracker module dragged onto the icon-bar will be split up into its component Sample and Tune data.

On the disc supplied, there is an empty Sample directory and the program is set up to store the split components within this. If you want the Sample component data to be saved to a different directory (after installing on a hard disc, for example) you should click <select> on STmodmake's icon to reveal the Sample Directory window and then drag the required destination directory icon from a filer window into this window, before attempting to split the SoundTracker module. I tried splitting the "We're" file, which created 12 sample files, and popped up a Save dialog box offering to save the tune data as a Music (AF1) file. However, Maestro could make no sense of this file.

The !Sprites file in STmodmake redefines the icon for filetype AF1. This is annoying (though easily dealt with) as once STmodmake has been seen by the filer, Maestro files will be shown with this new icon. I personally think that the original icon is clearer, though that's because I use small filer icons so as not to clutter up my display. The problem here seems to be that STmodmake should use a unique filetype for its tune data files. If this tune file is dragged back onto the STmodmake icon, the referenced samples are loaded in, combined with the tune data, and a Save dialog box is popped up, enabling you to save the newly (re)created module.

The TrackCTRL application provides basic control over a SoundTracker song whilst it is playing. There are mute and stereo balance controls for each of the four channels. The overall tuning may be adjusted and there are also speaker on/off and pause controls.

Seven tunes are provided and these are really quite impressive. These are the best sounds I have heard coming from the Archimedes' sound system. The tunes are enuTomeD, HowDeepIs, Igarun, MyWay, Pat, Pretend and We're, all of them being fairly up-tempo (Yello/house sort of thing).

An oddity is that there is another STracker application within the STmodmake application. Both copies, though different in their !Boot and !Run files contain the same version of the SoundTracker Relocatable Module, V1.03, though under different names. There also seems to be some confusion with filetypes used for SoundTracker modules, namely:

001 = (icon only) as defined by the version of STracker within STmodmake,

002 = STracker as defined by the main STracker application, and

651 = STracker as defined by STmodmake.

All three types are given the same icon.

Utilities

Two utilities are supplied, Metronome and MidiVision.

Metronome is not multi-tasking though is otherwise RISC-OS compatible. It provides an audible and visual indication of a regular tempo. The visual display comprises a numeric indication of bpm (beats per minute) and two alternately flashing 'blobs'. There are 6 control icons: Faster, Slower, Sync, Speed, Names, and Quit. Sync restarts the cycle. Names brings up a screenful of the Italian names used to indicate tempo: andante, allegro, etc. Clicking on one of these will preset the tempo to the associated bpm value and return to the main display. Faster/Slower modify the bpm by +/- 1. If the current tempo matches one of the Italian names, then this name is displayed.

I would have liked to have seen the two adjacent names displayed for intermediate bpm values. The Speed option is what makes an otherwise mundane program much more interesting and even useful. It prompts for 10 mouse clicks, from which the average tempo is calculated. Try this whilst listening to a record, tapping in time, to determine its tempo. Chart/dance material is generally a constant 120bpm. The fact that this is a single tasking application is not a great problem because, in use, you would run this for the minute or two that it would take to ascertain the required tempo and then Quit back to whatever you were doing within the desktop (running Maestro, Inspiration, or Rhapsody, etc).

MidiVision is a program I was keen to see in action, as I'm well into Midi. Just in case there's anyone out there who doesn't know of Midi: Midi is an abbreviation for Musical Instrument Digital Interface, and is an internationally agreed standard protocol for the communication of musical data between various manufacturer's pieces of musical hardware. This data can relate to tune information (notes and timing) or voice definitions, amongst others. To use Midi software on the Archimedes you will need a Midi podule.

A Midi data monitor (which is what this program purports to be) is a useful utility for anyone experiencing compatibility problems between various Midi devices or for anyone who just wants to know what is going on, regarding the flow of Midi data within their system. It does this by displaying an interpretation of the data arriving at the Midi In socket, from your Midi drum machine, keyboard or whatever. This is what it should do but unfortunately it doesn't. It indicates a Note Off event, irrespective of what the event actually was. It also gets totally confused about the Midi channel.

I suspect that the problem is due to this program having been written for use with version 2 of the Midi ROM. I have the latest version 3.14 (necessary if you want to run Pandora's Inspiration sequencer, incidentally) which has a subtley different specification for the "Midi_RxByte" SWI, which this program uses to read the incoming Midi data. However, even if it worked as intended, the display, though comprehensive, is boring to say the least. Scrolling black and white ASCII, with no graphical interpretation of any kind.

Conclusion

There is no 'productivity' software on this disc – it should be thought of more as a demo disc, though Maestro tunes do have an educational value as it clearly demonstrates the relationships between those little black dots and the actual music that they represent. I am a little disappointed in the lack of Midi applications – just one entry, and that was a non-starter. However, that aside, if you've an interest in making music on your Archimedes, then this disc has got to be seen as being good value. It's also a good demo of what the recently released SoundTracker editor package.

PipeLine

Gerald Fitton

Thanks once again to all who have written to me. I shall start with a few hints and tips, together with a few short pleas for Help and then move on to this month's tutorial – the simplest of databases. Looking back at this month's article, I find that I still haven't caught up with all the information you have sent me. Many of the bigger items I've received are on the January 1991 PipeLine disc (available from me at Abacus Training) rather than in the Archive PipeLine column and I still have some substantial articles available for the April 1991 disc! All I can say is "Thanks again" and don't be put off by the massive amount of material that has been sent me – please send me your contribution all the same. Most letters get a reply within a week but a few, particularly the ones which bring new problems to light, take a little longer. A few letters, less than 1%, have taken me several weeks to find the right reply – sorry about those.

I heard on the grapevine that Paul has become most enthusiastic about PipeDream. I am now getting letters which start with a comment about how Paul's enthusiasm has influenced them in the purchase of PipeDream! Let me say to such new users that, particularly as a spreadsheet, I don't think you will 'grow out' of it and want something more sophisticated – in fact, I think that there is no 'better' spreadsheet for the Archimedes on the market. Furthermore you'll find that it's as good as any other wordprocessor and, as a database, it may be all you need. Of course, for graphs and charts you need a hot-linked package such as Presenter or Graphbox and, as a DTP package it is nearer the WP end of the scale. Anyway, if you want to get the best out of PipeDream keep buying Archive and keep reading this column! [Better still, buy the PipeLine discs as well!]

DTP fonts

Although my article on fonts a couple of issues back was not part of the PipeLine series, as a result of it I have received a lot of correspondence about fonts. One suggestion from at least a dozen of you is that each month the PipeLine article should be produced (at least in part) in a different (named) font! The idea is that readers should see a substantial piece of text in the 'Font of the month'. My immediate response is: "that's up to the Archive Editor, but I'll mention it to him!". So Paul, here it is mentioned – correspondence to you? Now, I believe that it might be even more educational if a single short item (say in the Archive Matters Arising) were to be printed in two different (named) fonts. My reason for this suggestion is that I know that the same text printed in different fonts can appear (to the unaware reader) to contain completely different information. It is important that the writer chooses a font which matches the message they wish to convey. Even the point size can have a subtle effect.

Maths printer driver

Peter Wicks has a maths printer driver for the Panasonic KXP1624. Write to him direct at 12 Lavender Lane, Powledge, Farnham, Surrey GU10 4AX.

Life

Melfyn Lloyd of Manchester is working on a game of Life using PipeDream cells. If you are interested then write to me and I will pass your letters straight on to him.

!Spark

How do you feel about disc suppliers (such as me at Abacus Training) using this file compression utility to squeeze more data onto a disc? Some readers think that it might be a good idea to compress selective files such as memory hungry sprites but not compress large databases (such as the 1987 General Election results – on the January 1991 PipeLine disc thanks to Danny Fagandini). Others seem to want nothing compressed because it is an extra task ('a bit fiddly') that has to be completed before loading a file. What do you think?

Hard space

Another use for the hard space character (you get a hard space by holding down Alt and tapping the space bar) is to ensure trailing spaces on right aligned text don't disappear when you save the file. Thanks to David Turner for this one.

Continuous A4 stationery

Has anyone got a definitive answer to how to use this sort of paper without getting unwanted line feeds? If so then please let Alan Afriat of 24 Combemartin Road, London SW18 5PR know how it can be done. I'd like to know too so that I can pass the information onto others who have asked. One tip is to include the command 27 67 70 in your PipeDream printer driver PON string to set the correct page length. Does job_prologue do this with a RISC-OS printer driver?

Discarding values from a range

Discarding one value is easy using Sum(range) – Max(range). John Harrison wants to know the best way of identifying the second largest (or smallest) value in a range so that he can discard the two largest values of race times taken in a series of dingy racing results.

Latest version of PipeDream

I expect that Robert Macmillan hopes even more than I do that Pipedream has stabilised at version 3.14. Generally, if you have a version earlier than 3.1, then you ought to upgrade (it's free) – if you have 3.10 or later and you are happy with it then there is no real urgency. To get the most rapid turnaround from Colton you should send your master disc together with a sticky label with your address on it together with a 22p stamp. In your covering letter quote your registration number – you will find this by clicking the menu button over the installed PipeDream icon and running the pointer through 'Info'.

Incorrect number of output bits

This has caused too many people too much hassle! After much investigation, here is one common cause of getting this error message from PipeDream. It is because you have an early version of the SuperMono module supplied with Impression. If your version of Impression is earlier than 1.05, I suggest you upgrade or at least delete SuperMono from your !System. Modules directory (or wherever it is). Don't try running both Impression and PipeDream if PipeDream is earlier than 3.1 or Impression earlier than 1.05 (or both)! You should have FontManager 2.42, ColourTrans 0.52, Printer drivers 1.12 (later versions are probably OK too). If all this fails then Colton have volunteered to get confused as well (so write to them direct enclosing a disc file of your example stating what modules or software you had installed at the time Pipedream crashed)!

The Hodge Dictionary

This is available from Norwich Computer Services (Archive) and contains 103,538 words which are not in the Colton dictionary.

Maximising RISC-OS printing speed

Has anyone any tips on this which are particularly suitable for those without a hard disc?

Stack extension problems

What are they you might ask? Because of a problem with Acorn's C Library prior to Clib version 3.66, PipeDream sometimes fails to extend its WimpSlot automatically and you get the error message Stack Overflow! If you don't have Clib V3.66 (or later) then increase the value of WimpSlot -Max which you will find in the !PipeDream.!Run file in 32kbyte steps until the problem goes away. By the way has anybody got a copy of Clib 3.66 or later?

View Professional

I'm sure you'll tell me if I'm wrong but I reckon that this package was the elusive PipeDream 1. I say 'was' because Colton have now sold out and don't propose to make any more. If you've always wanted View Professional then snap up one of the last few from distributors before they run out.

Paragraph numbering

Insert a new narrow column A. In A2 enter the expression:

```
if(B2<>""&B1="",max(A$A1)+1,"")
```

and replicate it down the column A. Find out for yourself how it works as an exercise!

This month's tutorial – a simple database

The limitations of Pipedream as a Desk Top Publisher, such as the exact positioning of a graphic, really arise because, as I described under the heading "Disappearing Text" last month, the screen area is divided up into cells so that it can be used as a spreadsheet. However, it is these same cells that make it possible to use PipeDream as a simple database. It is the use of these cells as the fields of a database that I shall describe in this month's tutorial.

In a series of articles on the PipeLine discs (available from Abacus Training), Stephen Gaynor explains exactly what is meant by a relational database and describes the limitations of and 'workarounds' for PipeDream when using it as a complex database. Generally, to understand Stephen's approach in depth, you need to get familiar with database concepts using something simpler.

Files, records and fields

Relational databases consist of many files but the simplest of databases consist of only one file. This month's example file is on the Archive monthly disc as 'Girls' and a screendump is shown in the figure on the next page. The file has eight 'Records' (numbered 1 to 8 for convenience) but could have many more. Each record uses one row in PipeDream and has values for every one of five 'Fields'. The five fields are: 'Name', 'Hair Colour', 'Eye Colour', 'Character' and 'Favourite Present' for each of the eight (fictitious!) young ladies.

Screen layout

To make my database fit neatly onto the screen with a small border, I have reduced the width of column A to 8 characters (using Ctrl-W) but really, for this example, it isn't necessary; you can use the default of 12 characters for all columns.

I have used the mouse to set File – Options – Grid so that the grid lines you see on the screen dump separate the cells. Click <menu>, run the pointer through Files and then through the sub menu Options and click on the small rectangular box just to the right of the word Grid so that you get a blue star in the box. When you click on OK or press <return>, the grid will appear.

Record numbers

An easy way of generating the numbers 1 to 8 in the column A8A15 is to use the formula (row – 7) in the column. Start by placing the cursor in A8, press <F2> (Edit Expression) and type in the formula (row – 7) and press <return>. At this stage you may have to use Ctrl-LDP (Layout Decimal Places) to set zero decimal places for the numbers so that 1 (in A8) appears as 1 and not 1.00. With the cursor still in A8, press <F3>. Move the cursor to A15 and press <F3> again to mark the column A8A15. Use the command Ctrl-BRD (Block Replicate Down) to replicate the formula down the column (to give the numbers 1 to 8) followed by Ctrl-BSS (Block SnapShot) to change the formulae to fixed numbers.

The records

The rectangular block of data, B8F15, is all text and can be typed in exactly as shown. The rows are the database records, one record per row and one field per column. To move right from column to column (field to field) you must press the Tab key. To move left, you hold down <shift> whilst you press <tab>. To move from row to row, you can use the return key to move down and the up arrow key to move up. You can use the mouse pointer; click the select (left) mouse button with the pointer in the cell where you want the cursor.

Column headings

Row 4 is pure text – type them in as shown on the screendump below.

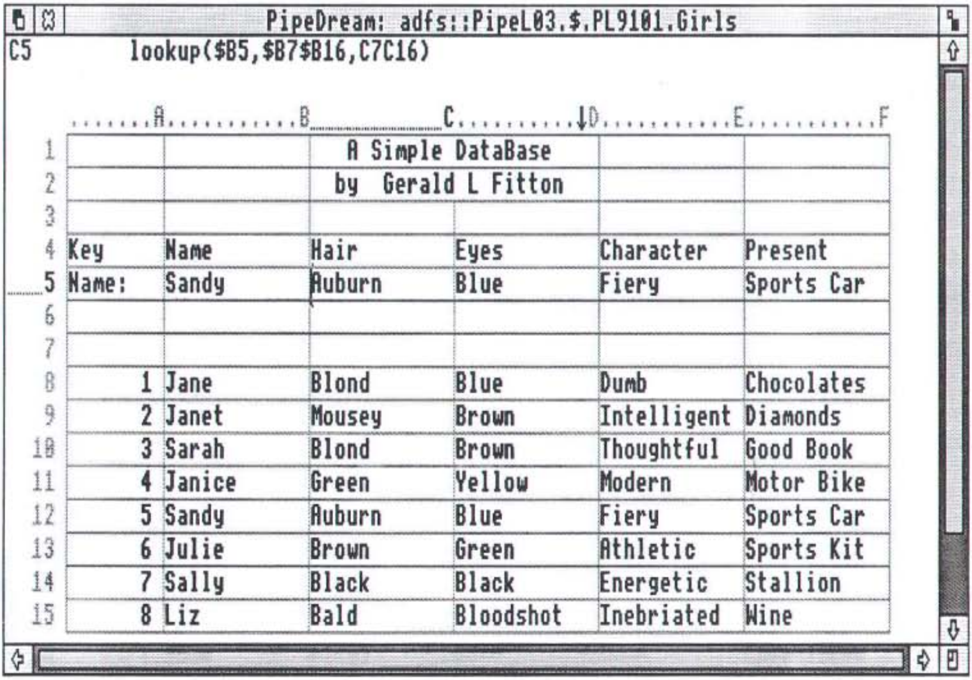
The key field

Type the word Name: into A5 and 'Sandy' in B5. You have to imagine that the database has hundreds or thousands of records (all with different values in the key field – see Stephen Gaynor's article on the PipeLine series for the reason why the records must have a unique key) so you can't scan your eye down the list of 8 records and pick out Sandy immediately. What we are going to do is create a database lookup function (see below) which will find Sandy's record for you.

The lookup formulae

Now we come to the database formulae. Place the cursor in C5, press <F2> (Edit Expression) to enter a formula into C5. Type in the lookup formula lookup($B5,$B7$B16,C7C16) as shown on the screen dump below and then press <return>. When you press <return>, the word 'Auburn' will appear in the slot C5. What has happened is that the lookup function has used the first argument of the formula (the value in the cell B5) and found its value (which is Sandy).

The second argument of the lookup function is a range (the values in the column B7B16) and the value 'Sandy' is found as the 5th record. The third argument is another range (the values in the column C7C16) and the 5th value in this range is 'Auburn' so 'Auburn' is the value returned by the lookup function. Summarising this, the value of the first argument (Sandy) has been found as the 5th value (counting from top to bottom) in the range of cells



C5 lookup($B5,$B7$B16,C7C16)

	A	B	C	D	E	F
1			A Simple DataBase			
2			by Gerald L Fitton			
3						
4	Key	Name	Hair	Eyes	Character	Present
5	Name:	Sandy	Auburn	Blue	Fiery	Sports Car
6						
7						
8	1	Jane	Blond	Blue	Dumb	Chocolates
9	2	Janet	Mousey	Brown	Intelligent	Diamonds
10	3	Sarah	Blond	Brown	Thoughtful	Good Book
11	4	Janice	Green	Yellow	Modern	Motor Bike
12	5	Sandy	Auburn	Blue	Fiery	Sports Car
13	6	Julie	Brown	Green	Athletic	Sports Kit
14	7	Sally	Black	Black	Energetic	Stallion
15	8	Liz	Bald	Bloodshot	Inebriated	Wine

given by the second argument and, because Sandy is the 5th item in this range, the function lookup returns the 5th value (counting from top to bottom again) in the range given by the third argument.

The next step is to replicate the formula in C5 across the row from C5 to F5. The quick method is to mark the block C5 to F5, by pressing <F3> in C5 and then in F5, followed by the command <ctrl-BRR> (Block Replicate Right). The $ signs in front of the B's in the formula ensure that the B's remains fixed as B's in the newly generated formulae; the absence of $'s in front of the C's in the third argument ensure that in column D, the C's in the formula change to D's. Similarly, the C's change to E's and F's for columns E and F respectively. For example, the lookup formula in E5 is lookup($B5,$B7$B16,E7E16) which finds the value 'Fiery' as the 5th value in the range E5E16.

The title

Complete the database by typing the title into cell C1 and you can add an appropriate comment in C2 if you wish.

Lookup someone else's record

Place the cursor in cell B5 (where you find Sandy), delete Sandy and type in Julie instead. The record in row 5 will change from being Sandy's record to being Julie's record complete with Brown hair and Sports Kit. Try entering a few more of the girls' names in B5 and watch the record in row 5 change to match. Generally, at its simplest, selecting a record from hundreds or thousands by entering a key is what a database is used for.

Put Sandy's name back into B5 before you try the next exercise.

Sorting by column

The more astute of you will wonder why (in the lookup function) I have used the range of rows from row 7 to row 16 inclusive, instead of the range from row 8 to 15. The answer is that you can now sort the block A8F15 without corrupting the database formulae in C5F5. Let's sort the block on column B so that we get the girls' names in alphabetical order. Using the mouse (or the cursor control keys if you wish) place the cursor in A8 and press <F3> (to mark the cell). Place the cursor in F15 and press <F3> again to mark the block A8F15. Place the cursor anywhere in column B (where the girls' names are), use the command <ctrl-BSO> (Block SOrt) and you will find yourself with a menu called Sort. Although it doesn't matter in this case, click the mouse select (left) button in the Multi-row records box to remove the star and then click on the OK box. The whole block will be sorted record by record (row by row) and Sandy's record will no longer be the 5th but the 7th record between Sally and Sarah. Because neither row 7 nor row 16 have moved, the formulae in C5 to F5 remain intact.

If, in the lookup function, you had used the range from row 8 to row 15 and sorted the database so that either of the rows 8 and 15 moved, then the lookup formula would change. If you don't believe me then modify the lookup formula in C5 to lookup($B5, $B8$B15,C8C15) and replicate right (as before) from C5 to F5, sort on column A (back to the original order) and check your formula. Although you still have 'Auburn' in C5, the formula has changed so that now only part of the database will be searched for Sandy. Try all the girls' names and you will find that the lookup command fails with some (but not all) of them. I have had dozens of letters from correspondents who have sorted a database or spreadsheet and then found that their Sum, Avg, Count, Lookup, etc fail to give the correct answer; their problem has been that the argument of the function such as Sum (first and last item of a long column) has changed during sorting because they have not included two blank rows (which are not sorted) as the first and last items in the argument of the Sum formula.

Put the formulae back to their original form (with rows 8 and 16) before moving on to the next exercise.

Sorting on two columns

If you sort the database by column C then you will find two Blonds, Jane and Sarah. To do this sort, mark the block A8F15, place the cursor in column C and then type in the command Ctrl-BSO. The Auburn haired girl, Sandy, will move up to row 8 with the two blonds in rows 11 and 12.

It is not possible to forecast the order of the two blonds (Jane and Sarah) from this sort operation; they are not necessarily in alphabetical order. However, it is possible during sorting to choose a secondary field so that, if the first field (C, the hair colour) has equal values then the database is sorted using the secondary field. Using this technique you can separate the blue-eyed blonds from brown-eyed blonds! To do this, proceed as before but enter a D into the second Sort on column dialogue box. That way you will ensure that blue-eyed blonds precede brown-eyed blonds in the sorted list.

Adding rows

Perhaps the simplest way of adding a row is to place the cursor somewhere in the middle of the data and press <F7> to insert a row. All the formulae in row 5 will change to match the enlarged database. Type in the data and, if you want to, you can sort the database again on any column or (using a secondary key) columns. You can also delete a record using F8 to delete a whole row.

Over to you

Next month, I shall explain how to use a Master Row for data entry and how to use this simple database to enter data into a 'form letter' or mail shot. There is nothing like experience so, have a go at adding more data or even changing some of the data and see what the effect is when you sort the database. What do you think happens if you click in the Ascending order box? Try marking the whole database (with <F3>) followed by Ctrl-BM (Block Move) and you will see the formulae change so that the cell references still pick up the data you want.

In conclusion

Here is my usual plea to send me your letters and examples on disc. If you feel like being really kind then a self addressed sticky label and stamp will be most welcome.

Chocks Away

Alan Highet

Chocks Away is a delightful game which is perfect for all those who found Interdictor too difficult. Having said that, don't get the idea that it easy because the missions get progressively more difficult as you proceed.

The game comes on two discs, the master disc and the missions disc. There is a promise of more missions later in the year, with the ability to link two Archimedes together to fly two planes in the same scenario and possibly even a network version!

For those who haven't heard about this game, it is a Tiger Moth simulator and on booting up you are given the choice of one or two player games, practice sessions or the missions. The practice session is further divided into choices, with the chance to brush up on take-offs, landings or the various types of combat such as air to air or air to ground. The graphics are good and, in version two which I am using, they move quickly and smoothly in response to your commands.

Unlike Interdictor, the controls are simple with up, down, left, right and fire being the main ones and they can be controlled from the keyboard, the mouse or a joystick. The other controls, apart from pause, are the ability to look left, right and backwards as well as being able to see the same four views from outside your aircraft (as if from another plane) giving you better visibility.

On selecting a mission, you see the inside of the briefing room with a moustached RAF officer explaining on the blackboard the purpose of your mission. A nice touch here is that the clock on the wall runs in real time.

During each mission, a map is available showing your position and direction and that of the target(s). You need to complete one mission to move on to the next but you can repeat a mission as many times as you like. There is a score for each mission and the challenge is to try to beat your previous score kept in a high score table so the game has no end even when all twenty missions are completed.

A final option is the ability to record all your flights to disc and, on replaying them, join in where you went wrong the last time although your score is reduced for cheating!

I can thoroughly recommend this for all the family and if you didn't get it for Christmas then go out and buy it.

(Alan was using Chocks Away 1. Version 2, with improved speed of graphics is available at the same price of £24.95 or £23 through Archive. Ed.)

Direct Screen Access

David Ramsden

In this article I hope to explain a little about the workings of the Archimedes video display and present a general sprite plotting routine which runs far faster than OS equivalents.

Most personal computers, including the Archimedes, have what is known as a bit-mapped display. This means that each part of the screen has some memory in the computer allocated to it. Obviously, the more RAM you set aside for the display, the more detail you get on screen. Against this, however, has to be balanced the total memory left over for running applications and also the time the main processor spends simply updating the screen – too much and other tasks tend to grind to a halt. This is what is meant by video bandwidth and its effects on machine performance can be seen even on the Archimedes with its fast ARM2 processor.

As an experiment, switch your desktop to display in a 256 colour mode and compare the speed at which the windows are redrawn and the smoothness of movement when instant effect drags are enabled (use !Configure to set this up) with that of a 16 colour mode. One way around this problem is to fit a faster central processor such as an ARM3 on the Archimedes. Another, which the Amiga uses, is to minimise the amount of work the main CPU does. This is achieved by having another processor to deal with certain aspects of the system, such as plotting images on the screen.

Unfortunately, the ARM has no such co-processor to share the work and no hardware generated sprites. All such images have to be implemented in software, such as the Sprite module in RISC-OS. However, as Bjørn Fløtten pointed out in his article, (Archive 2.10 p23) these routines are generalised and therefore relatively slow.

On the Archimedes/A3000, the chip responsible for generating the display is the VIDC – VIDeo Controller. Fifty times every second, it asks the ARM to stop what it is doing and give it the data to display, which it then converts into the image we see on the monitor. This data is held in the video ram, hence a bit-mapped display is produced. So to alter the screen directly we simply use the ARM's STR instruction with the address being the appropriate part of video ram.

The program below illustrates this. Key it in and run it: you will be prompted to enter some screen co-ordinates. The pixel entered will then be highlighted firstly by a standard BASIC command and then on pressing the space bar by a short machine code routine to alter the screen directly.

```
 10 REM >listing1
 20 PROCassemble
 30 MODE 13
 40 screenstart=&1FD8000
 50
 60 REPEAT
 70   CLS
 80   INPUT "Enter x value(0-1279)";x
 90   IF x<0 OR x>1279 VDU 7 :GOTO 70
100   INPUT "Enter y value(0-1023)";y
110   IF y<0 OR y>1023 VDU 7 : GOTO
100
120   y=INT(y/4)
130   x=INT(x/4)
140   offset=320*(256-y)-320+x
150   address=screenstart+offset
160   PROCpoint
170 UNTIL 0
180
190
200 DEF PROCpoint
210
220 GCOL 20 TINT 255
230 POINT x*4,y*4    :REM set pixel
                   with basic command
240 REPEAT UNTIL GET=32
250
260 GCOL 0 TINT 0
270 POINT x*4,y*4    :REM erase pixel
                   with basic command
280 PRINT "Screen memory address is
                          &";~address
290 A%=address       :REM set r0 to
                        pixel address
300 CALL code        :REM set pixel
                    with m/c routine
310 REPEAT UNTIL GET=32
320
```

```
330 ENDPROC
340
350
360 DEF PROCassemble
370 DIM code 12
380 P%=code
390 [
400 MOV R1,#54       ; r1=colour to be plotted
410 STRB R1,[R0]     ; store r1 in video ram
420 MOV R15,R14      ; return to basic
430 ]
440 ENDPROC
```

Running the program in mode 10 shows up an interesting little quirk on the Archimedes. If you read the mode descriptions, you will see that mode 10 has only half the horizontal resolution of mode 13. However, direct screen access in mode 10 results in a pixel the same size as mode 13. This is because the VIDC is not capable of producing a horizontal resolution as low as 160 pixels so to overcome this the RISC-OS plots double pixels!

Mode 13 is a 256 colour mode and so each pixel on screen is held in memory as exactly 1 byte so a STRB instruction will affect only 1 pixel. If, however, a non-256 colour mode is used in the program, more than 1 pixel is affected by STRB. For the sake of simplicity therefore only 256 colour modes will be considered in this article.

Before we can store data directly into the video ram we need to have some data! Create a 24x24 pixel sprite in mode 13 using !Paint, etc. Leave a black border one pixel thick around it. Name it 'sprite' and save it in a file called 'spritefile'. Now type in and run the program below, ensuring that the disc with spritefile on it is in the drive. It will create a new file called sdata which holds the sprite in the form of pixel colour data.

```
10 REM >listing2
20 REM Sprite converter program
30
40 PROCassemble
50 DIM sdata 1000
60 MODE 13
70 OSCLI"SLOAD spritefile"
80 OSCLI"SCHOOSE sprite"
90 VDU 25,237,595;459; :REM load and display sprite
100 A%=&1FE30D4    :REM r0=screen address of start of sprite
110 C%=sdata       :REM r2=data stack pointer
120 CALL code
130 SYS "OS_File",0,"sdata",0,0,sdata,sdata+1000 :REM save data
140 END
150
160
170 DEF PROCassemble
180 DIM code 512
190 FOR loop=0 TO 2 STEP 2
200   P%=code
210   [ OPT loop
220   ; r0=screen address pointer
230   ; r1=data
240   ; r2=stack pointer
250   ; r3=horizontal pixel counter
260   ; r4=vertical line counter
270
280   MOV R3,#0 : MOV R4,#0   ; init. count registers
290   .here
300   LDRB R1,[R0],#+1   ; get pixel data from screen
310   STRB R1,[R2],#+1   ; save it on data stack
320   ADD R3,R3,#1       ; inc. count1
330   CMP R3,#24
340   BCC here           ; go back if line not finished
350   MOV R3,#0          ; set count1 to start of line
360   ADD R4,R4,#1       ; inc. count2
370   SUB R0,R0,#344     ; point r0 to beginning of new line
380   CMP R4,#24
390   BCC here           ; go back if all lines not completed
400   MOV R15,R14        ; return to BASIC
410
420   ; to create sprites of different size to 24x24 simply alter the immediate
430   ; constants used in the CMP instructions and change the #344 in line 370
440   ; to #(320 + the new immediate constant in line 330)
450   ]
```

```
460 NEXT
470 ENDPROC
```

Now that we have the sprite in the new format, all that remains to be done is to display it on screen. The program below achieves this. Type it in and run it, ensuring that the disc containing the files sdata and spritefile is in the drive. Your sprite should move down the screen, being plotted by direct screen access. Pressing 0 and 1 on the keypad will toggle between plotting by RISC-OS and the custom routine respectively.

```
 10 REM >listing3
 20 REM sprite plotting routine
 30
 40 PROCassemble
 50 PROCassemble2
 60 MODE 13
 70 SYS "OS_RemoveCursors"
 80
 90 REPEAT
100   PRINTTAB(0,30);"Sprite plotted
              by direct screen access"
110   F%=sdata : G%=&1FD9E00 :REM r5=
                     point to sprite data
                       r6=sprite position
120   CALL code
130   WAIT : CLS
140   PRINTTAB(0,30);"Sprite plotted
              by RISC-OS routines     "
150   CALL code2
160   WAIT : CLS
170 UNTIL FALSE
180
190
200 DEF PROCassemble
210 DIM sdata 1000
220 SYS "OS_File",&FF,"sdata",sdata
                  :REM load sprite data
230 DIM code 1024
240 FOR pass=0 TO 2 STEP 2
250   P%=code
260
270   [ OPT pass
280   ; r0=sprite data
290   ; r1=sprite data pointer
300   ; r2=screen address pointer
310   ; r3=horizontal pixel counter
320   ; r4=vertical lines counter
330   ; r5=start of sprite data
340   ; r6=screen position of sprite
350
360   .here
370   MOV R1,R5    ; restore r1 to
             point to start of sprite
380   MOV R2,R6    ; make r2 point to
                     sprite's address
390   MOV R3,#0 : MOV R4,#0  ; init
                      count registers
400   .loop
410   LDRB R0,[R1],#1  ; load in next
                  byte of sprite data
420   STRB R0,[R2],#1  ; plot pixel
                     at address in r2
430   ADD R3,R3,#1       ; increment
                      count1 register
440   CMP R3,#24
450   BCC loop       ; go back if line
                         not finished
460   MOV R3,#0      ; re-init count1
470   ADD R4,R4,#1 ; increment count2
                             register
480   ADD R2,R2,#296  ; move onto
                            next line
490   CMP R4,#24
500   BCC loop       ; go back if all
                    lines not plotted
510
520   ADD R6,R6,#1  ; move sprite 1
                   pixel to the right
530   MOV R0,#&7A : SWI "OS_Byte"
                      ; scan keyboard
540   CMP R1,#106 : MOVEQ R15,R14
                 ; return to BASIC if
                     keypad 0 pressed
550   BAL here
560
570   ; to alter size of sprite
         plotted adjust the immediate
                    constants used in
580   ; the CMP instructions and the
                  #296 in line 470 to
               #(320 - new immediate
590   ; constant in line 430)
600
610   ]
620 NEXT
630 ENDPROC
640
650
660 DEF PROCassemble2
670 *SLOAD spritefile
680 DIM code2 512
690 FOR pass=0 TO 2 STEP 2
```

```
700    P%=code2
710
720    [ OPT pass
730    MOV R3,#0:MOV R4,#900:MOV R5,#0
        ; set up registers for OS call
740    .loop
750    MOV R0,#34 :ADR R2,sprite ;set
              up registers for OS call
760    ADD R3,R3,#1    ; move sprite to
                              the right
770    CMP R3,#1280  ; check if at end
                                of line
780    MVNEQ R3,#98 :SUBEQ R4,R4,#1;if
                     so alter position
790    SWI "OS_SpriteOp"    ; call OS
                          sprite routine
800
810    MOV R0,#&7A : SWI "OS_Byte"
                        ; scan keyboard
820    CMP R1,#107 : MOVEQ R15,R14
             ; return to BASIC if keypad
                               1 pressed
830    BAL loop
840
850    .sprite
860    equs "sprite"
870    equb 0
880    ALIGN
890
900    ]
910 NEXT
920 ENDPROC
```

The code to display the sprite is obviously not as fast as it could be, an obvious improvement being to remove all the branch instructions by macro assembly. It is easy to understand though, and is simple to modify to your own needs.

Noah Software

David Ramsden

Noah Tools #1

Noah Tools #1 comes on a single disc, with no accompanying documentation. Double clicking on the !Tools_1 icon results in a directory viewer appearing containing several files.

A !sprites file contains sprites which redefine some of the standard Archimedes sprites for certain file types. The directories look similar to those on the Amiga's WorkBench, and are quite pleasing, but I prefer the standard Archimedes sprites.

There are four RISC-OS applications:–

!FastRom speeds up the MEMC memory controller (similar to a hint by Mike Harrison in Archive), but I could hardly notice the speed improvement.

!ReBoot resets the computer and auto-boots. That could be useful for automatic configuration routines but Noah provide a far better solution – see later!

!Shell is quite interesting. It provides a replacement command line interpreter, which has several useful features. Firstly, it is possible to edit an input line. The major feature is the ability to keep a 'history' of commands entered which can then be automatically 're-typed'. !Shell even replaces OS_ReadLine, so almost any program that takes input from the keyboard can take advantage of this handy utility.

!WatchDog is **not** the Risc User program of the same name. It allows the editing of any BASIC program dropped on to the icon and provides a desktop dustbin that stores the last deleted program, just in case you change your mind. It will also open any application directory dropped on to the icon, or allow control of the pointer via the keyboard.

Also on the disc are four directories and a module to provide new screen modes for multi-sync owners.

The four directories are called IFF, Modules, SmallDemos and Source. IFF contains, not surprisingly, Amiga IFF (graphics) files and a program to display them.

Modules contains the afore-mentioned screen mode module and Source contains the BASIC source code.

The SmallDemos are rather disappointing. One bounces lines around the screen, while another produces a sinusoidal surface. The final program draws a polygon with an increasing number of sides.

I thought that this disc was on the whole quite useful. !Shell is probably the only program which I will return to but I think it will find great use.

Noah Tools #2

Noah Tools #2 also comes on a single disc containing a single application called !Tools_2. Double-clicking on this icon, another directory viewer opens. It contains five applications, a directory of help files, an RM for controlling the mouse from the keyboard and a couple of BASIC programs.

The applications are !Basic, !ColDemo, !DisAss, !NTree and !Watchdog (again!).

!Basic opens a directory viewer containing several small BASIC programs. There is a utility to backup a hard disc, two functions to control the escape key, a function to insert a string into the keyboard buffer, another to read a VDU variable and two small programs to draw a curve and present system information. These programs are fairly trivial, possibly with the exception of the hard disc backup program.

!ColDemo is a graphics demonstration to display 32,768 colours on a standard monitor, by reprogramming interrupts.

!DisAss is an excellent disassembler, entered by typing *dis. The program converts assembled programs into BASIC programs which can be used to re-assemble the code after modifications have been made.

!NTree is a disc tree program similar to such PC programs as Norton utilities and PC-Tools. The program seems to be well written and would be a boon for Arthur users but I consider the RISC-OS desktop to be more useful and intuitive.

A BASIC file-find program was also on the disc but better programs can be found on the Archive Shareware discs.

Noah Tools#2 is a mixture of well-written useful programs and small utilities with little utility. Having said that, I think that this disc is better value than Noah Tools#1.

Noah Tools #3

Noah Tools #3 was my favourite disc. It contains four fully RISC-OS compatible applications and a directory called Assembler.

!AutoMount is a handy utility which sits on the icon bar and waits for a disc to be inserted or removed. On insertion, the disc is automatically mounted – its directory viewer appears. When the disc is removed, all directory viewers belonging to that disc disappear. It really is quite amusing and behaves very like an Amiga.

!BootGen generates !Boot files for hard disc users, to automatically load programs and execute *commands. A window is opened into which programs to be run can be dragged or commands typed.

!Demo3 is excellent. When started, the screen clears and a message scrolls along the bottom. That doesn't sound very exciting but things get better and !Demo3 builds up into the best demo I have seen on the Archimedes. By the end, there is music playing, a VU-meter following the music, stars speeding out of the screen in a Star Trek fashion, coloured balls flying around and the quite interesting message scrolling away – the Amiga or ST can't even compete!

!SetupUti is a program to create small utility files (type &FFC) to set the task manager to the required values before running a program. This is a much more elegant method than the re-boot type automatic configuration.

The Assembler directory contains several BASIC assembler programs and accompanying text files. 'Setup' is the source for !SetupUti's output files and is quite interesting to see. 'IRQ' bypasses the OS and 'MControl' is the source for the Mouse Controller RM. 'Merging' merges two MODE 15 screens and 'TestKeyB' causes errors if keys are being pressed. 'OverScan' should create an overscan MODE but I was unable to get it to work.

This disc is the 'best of the bunch' and I would have no difficulty in recommending it.

Noah Demo #3

Noah Demo #3 contains four applications and one directory. The applications are !Atari, !ColDemo (I recognise that name), !Demo3 (that too!) and !FSM_Demo

!Atari opens a directory viewer containing several files – BILD2, BILD3, BILD4, BILD5 and DEGMOD. DEGMOD is an RM to load ST Degas format screens. Once loaded, double-clicking on a 'BILD' icon (bild is German for picture) causes the picture to be loaded. I recognise two of the pictures from a Superior Software advert for Hostages and another is the title screen from 'Super Hang-On'.

!FSM_Demo was difficult to load. I found that the only way I could run it was to set the Font cache and System sprites areas to 0K with the task manager, and the Screen memory to 264K. Then, press F12 and type '*Dir !FSM_Demo', and then 'Demo'.

The demo itself is quite disappointing – a few stars zoom around with the letters FSM swirling around the screen. A short message runs across the bottom of the screen and the whole thing runs in an overscan mode.

ASM is a directory containing several BASIC assembler programs:

Setup is the program from Tools#3 and SHELLCLI is the source for the !Shell program on Tools#1. NECMODEB is a screen mode 21 for NEC 3D monitors.

StarGen and **StarsOnly** are two programs relating to the stars used in !Demo3. Using these, it is possible to include these stars in your own programs. Most of the material on this disc can be found on the other discs, which I consider to be better value. If, however, you are only interested in the demos, then this would be a good buy.

Overall

These discs reminded me of the Archive Shareware and Careware discs. Overall, I prefer the Archive discs but these discs have one important thing in their favour – most of the source code is presented with the programs which means that it is possible to learn new techniques from these discs.

I can't wait for more from these German programmers (even if they do like to copy the Amiga and ST)!

These discs are available from GMA, Hamburg

Atomwide Prototyping Card

Ralph Barrett

During the last couple of months, I have been working on a personal project using the Atomwide APEC (Archimedes Prototyping Expansion Card). My project involved using the APEC card to interface to a Motorola 6554 ADLC serial communications chip (same as Econet!) reading data at 250,000 bits per second. This brief article is not strictly a review – really some hints for others intending to use the APEC for similar projects.

Firstly, the APEC board provides good value for money and is constructed to a good (adaptable) design, at a good overall standard. However, the manual supplied by Atomwide is really too brief for such a complicated subject and it contains several ambiguities and errors.

Let me offer some tips :

- Don't bother starting your own APEC project unless you have a good knowledge of hardware, especially 74 series TTL. A good grounding in ARM 'machine code' programming is also essential.
- I strongly recommend that anybody who intends to construct anything complicated, using interrupts, should invest in the new (Acorn) Programmers Reference Manual. The SWI's required have changed completely from the old PRM and no other book gives the required information. Needless to say, the Atomwide manual gives no software examples at all and very little hardware information on using interrupts.
- In order to simplify the construction of the card, the main 2764 EPROM has been installed "the wrong way round". Therefore always triple check this when swapping EPROMS (or RAM). I work in the electronics industry where it is very bad practice to design a PCB with an IC the wrong way round.
- The APEC ROM version 1.3 is set up for normal interrupts (PIRQ's). At present my interface will only function with an ARM 3 chip enabled. With the normal 8 MHz ARM2, RISC-OS runs very slowly (slower than the BBC emulator!). Therefore the Archimedes can handle approx 25,000 PIRQ's per second (my handler routine is 26 bytes long). Unfortunately I seem to suffer an occasional loss of data (single byte) which I suspect is caused by RISC-OS imposing a delay in reacting to a PIRQ. To overcome this problem, I have decided to use the fast interrupt system FIRQ's.
- I am currently modifying the interface to use fast interrupts. However to do this it is necessary to modify the APEC ROM code as follows:

  Change data at &1000 from &01 to &04.
  Set up FIQ status bit address at address &24 (new PRM p1642).

Set up OS_ClaimDeviceVector SWI pointer for FIRQ (R0=&08).

Note that I haven't tested this yet and more might be required.

- The legends on the APEC board show the chips U7 and U9 the wrong way around. U7 is an 74HC139 and U9 is an 74HC273 – watch out!

- My first APEC board (serial number 234) had an incorrect I.C. at U5. I had an 74HC14 instead of a hex inverter 74HC04. This fault cost me 6 weeks of my life as it caused my interface to work intermittently. Perhaps other boards are affected, so beware. *(I think that this may not be a valid criticism – See Martin Coulson's comments following. Ed.)*

- If you intend using an IC requiring a single chip select line then the information on page 7 of the manual (section 2.1.2.2) is incorrect. Pin 12 of U6 should be connected to pin 2 of U6, and cut the track between pin 12 and pin 3. The chip select is then derived correctly as PS AND A11.

- For generating interrupts, I tried using the arrangement for U8 shown on page 17 of the manual. This didn't work at all and I can't see any way in which it could work. Luckily I had a Texas 74 series data book at hand from which I deduced the following connections for U8 :

If the PIRQ interrupts are being used then

Connect pin 12 to ground (zero volts).
Connect pin 11 to the 2 MHz clock (from backplane).
Connect pin 9 to pin 2 of U4 (EPROM).
Connect TRIG PIRQ to your chip interrupt line (Pin 7 of 6554).

If the PFIQ interrupts are being used then

Connect pin 2 to ground (zero volts).
Connect pin 3 to the 2 MHz clock (from backplane).
Connect pin 5 to pin 2 of U4 (EPROM).
Connect TRIG PFIQ to your chip interrupt line (Pin 7 of 6554).

Conclusion

My interface works and I am pleased with the APEC card. It took a lot of toil and trouble to get it working but, in retrospect, it was worth it. Atomwide do provide good support to users of the APEC but it is unfair to expect unlimited detailed support for a PCB costing just £30-£40. The APEC card provides an economical method of connecting the Archimedes to a host of interfaces. It only provides an 8-bit interface which will limit the maximum data throughput. However, if you want a challenging project for those dark winter months, I can only recommend the APEC.

Martin Coulson of Atomwide writes…

The Atomwide APEC card is designed for use by people who have a good working knowledge of the 74 TTL series of logic devices along with the ability to solder. It is however true that simple projects such as a "User Port" may be constructed by adding only one device, a 6522 VIA, for which a circuit diagram is supplied in the manual. This particular project was produced for use in conjunction with a series of articles in BBC Acorn User (starting July 1990) written by Alex van Someren.

A selection of software was also written for these articles to allow a concept keyboard to be connected to the card and be driven by interrupts. This software was printed in the yellow pages of the magazine and is available on the APEC utils disc. The software consists of the source code for a driving module and the compiled module. Using this software as a base to work from and in conjunction with the Acorn Programmers Reference Manual it is possible to write your own interrupt software. However, simple products that do not involve interrupts can make use of the software supplied in the EPROM that comes with the APEC card.

When the APEC card was designed, several points were considered before laying out the PCB. Should the board be compact? Which way round do we put the EPROM? How many signals do we bring to the edge of the square pad? We decided to position the EPROM upside down since the tracking for the circuit board would be considerably simpler this way and allow us to have a slightly spread out layout on the PCB. We allocated 50% of the board area to square pad and the remaining 50% to the interface circuitry. This was intentional since we had a limited area down the side of the square pad area to provide control signals (Data bus, some of the address bus, CS signals and some interrupt control). We realised that whichever set of signals we put along this edge of the square pad (by definition of the variety of projects that would be built on the APEC) it would not be enough for all possible projects and it would be necessary to take wires from the circuit area of the APEC card. For this reason, the layout is far from compact and the EPROM is the wrong way round.

There is no functional difference between a 74HC14 (Hex Schmitt trigger) and a 74HC04 (Hex inverter), both these devices have been used in the production of APEC cards and both are equally effective.

The APEC Utils disc contains a "Burn" program for copying ROM images into a RAM device fitted to an APEC card, the source code to the APEC ROM with a copy of the ROM image, two test programs, one which activates all the pins next to the square pad area and one which reads and displays the registers of a 6522 fitted to the APEC card and all the files relating to the article in Acorn User.

Current prices (ex VAT) for APEC's are as follows:

Bare card plus EPROM	£30
Built card fitted with EPROM	£40
Built card fitted with RAM	£45
APEC Utils disc	£4

(Prices are £32, £43, £49 and £4 respectively through Archive.)

Risc User Games Omnibus

Geoff Scott

I'm not exactly sure what I was expecting the Risc User omnibus games disc to contain. Perhaps I thought that I would receive seven new, quality games which which were completely bug free and a pleasure to play. When I received the disc, I found it to contain a wide selection of games, but the quality of these was somewhat disappointing, and I think that all of the games had been featured on one of the Risc User monthly discs in the past.

The first game on the disc is !aMaze. This program, as the name suggests, is a maze game. It is played on a 7 by 7 grid which is decorated in various different coloured blocks for the walls and has several different 'sets' of treasure to collect. To play the game, the player must 'add' a randomly chosen block to one edge of the maze, the remainder of the row being scrolled to one side to accommodate it. After this, the player has to move in an attempt to land on a piece of treasure. This game seems to be the most easily played on the disc: it is entertaining and fairly-well programmed, although it has been featured on a Risc User disc and the Volume three Special Disc.

!Balloon is set in the mould of the BBC Percy Penguin, and seems to have taken many of its ideas from this. The basic idea is to trail around a screen containing both blocks and balloons and, of course, a monster or two. The aim is to burst all the balloons, although trapping the monster by pushing blocks around is also an entertaining pastime. This game would appeal more to the younger generation. The graphics in this game are not astounding, indeed, I have seen better on a BBC.

!Cribbage is the card game cribbage, played with five cards. The idea is to lay cards down until neither player can lay without the score exceeding 31, or all the cards having been laid. For a computer version of this I found it to be acceptable – it had nice graphics with even a touch of animation, although I was not able to play the computer very well as I was only taught by the instruction leaflet supplied – I had no previous knowledge of the game.

!Dominoes is the traditional version, with up to four players playing simultaneously. This is the only game which multi tasks under the wimp and, because of this, playing it is pretty much self-explanatory. To play, you simply click on the piece you wish to insert on the board and it is transferred immediately. The graphics within this game were nothing special, simply adequate, but it is a fun game that will provide at least a few hours of desktop fun.

Next on the disc is !Moric, a graphical adventure along the lines of the Beeb's Citadel. Moric was a frequent gambler but he has been made redundant as a miner, leaving a huge debt to be repaid. His wife has also stopped speaking to him until it is fully repaid. Usefully, an uncle dies leaving him a mansion littered with many expensive objects which he can sell – if he can collect them. I quite liked this game because of the plot. The graphics are large and often smoothly animated, but the sound again seems to leave a lot to be desired.

Ogre's lair is, in my opinion, the best game on this compilation. It is a two player game with split screens, both of which can scroll in any of the sixteen directions possible at any time. The idea is to explore the ogre's lair in search of the ogre, then to kill him. Out of the sixteen levels I have managed to proceed onto level two, and I have found plenty of different things to do there, like unlocking doors, shooting turrets, transporting things around the place and a lot more. The graphics are smooth and flicker free, with a ScrollText along the top of the screen. However, yet again, the sound is not brilliant – simple bongs occasionally but that's about all.

The last game on here is !PickaPair. This is a game played by two players on an 8 by 8 grid, each taking it in turns to select two places that they hope will match. Sound in this game was totally non-existent, but the graphics were drawn pretty well, although I have seen better PD versions.

In conclusion, I would say that if you want seven games for £12.99 then you should be prepared to accept the quality of them – don't hope for masterpieces, but for a younger child these games are ideal. You have been warned.

Shareware Nº 36

Mike Allum

Where a program installs itself on the icon bar I have indicated this by calling it an application and by putting "desktop compatible" as one of its features. "RISC-OS compatible" indicates a program which runs from the desktop and returns cleanly to the desktop on exit.

Programs on disk.

!Filter	–	Disk file search and replace utility.
!SparkPlug	–	File de-archiver.
!GuessType	–	Intelligent filetype setter.
!ModeInfo	–	Screen mode analyser.
!WasteBin	–	YADDB...
!Backup3	–	Hard disc archiver
!FontDir	–	Outline font library manager.
!CAST/CB	–	Cash book.
!CASTOCK	–	Stock book.
!3D-Graph	–	Animated 3D graphs.
!STModFix	–	Sound tracker module repairer.
!Midi	–	Midi instrument data up/downloader.
ArcAnsi	–	ANSI-type <esc> sequence interpreter for comms.
IceManager	–	Serial comms enhancer.
Miniterm	–	ANSI terminal emulator using IceManager.
ModDis201	–	Module disassembly/repair

!Filter

This is a utility to strip out or modify "unwanted" bytes in a disk file. Once installed on the icon bar, any file dragged to the icon will be processed to extract bytes selected by the user, a typical use being to remove all occurrences of the tab character from a text file. It may also be used to modify bytes instead of removing them – an example being to translate all newline characters to formfeeds.

Several deletions and translations can be made concurrently, the selections being made by the use of a menu box. Settings have to be defined each run and are specified in decimal.

- ✔ Desktop compatible
- ✔ Mouse driven
- ✘ Limited use for average Archimedian
- ✘ Settings may not be stored
- ✘ Source file is modified

A tidy application of use to programmers. The need to re-define settings does not lend itself to repeated use. For text files, I would recommend the use of global search/replace in a text editor.

!Sparkplug

This is a file de-archiving utility which will handle both Archimedes and IBM PC (yuk!) ".ARC" format archives.

Once installed on the icon bar, files and even whole directory trees may be copied from archives as if the user were in the desktop filer.

- ✔ Desktop compatible
- ✔ Mouse driven

✓ User transparent

An excellent application, the user-transparency of which more than makes up for the lack of documentation.

!GuessType

This is a filetype guessing/setting utility.

Once installed on the icon bar, it examines any file dragged to its icon and makes an educated "guess" as to the probable type. The user is then notified of the guess and prompted to accept the guess, or make it guess again. On acceptance, the filetype is changed to that guessed.

Note that the program hangs the system if a directory is dragged to the icon by mistake!

✓ Desktop compatible
✓ Mouse driven
✓ Intelligent "guess" algorithm
✗ Insufficient error trapping (fatal)

An extremely useful application of use to anyone transferring untyped files (downloads, BBC files, etc.).

!ModeInfo

This is a screen mode information extractor.

Once installed on the icon bar, clicking the icon reveals a list of all currently available modes in the range 0 to 127. Clicking on one of these pops up a window containing information on the memory used, control registers, and even frequencies.

✓ Desktop compatible
✓ Mouse driven
✓ Might save you £100's!
✗ RISC-OS version 2.00 only
✗ Limited use for average Archimedian

An extremely clever application of interest to very few, but which may save you a packet if you are designing screen modes and don't fancy sticking the wrong frequency up your monitor by accident!

!WasteBin

Yet another desktop dustbin utility!

Once installed on the icon bar, any file dragged to the dustbin icon is removed from its home directory and placed in the dustbin's application directory, effectively removing it from the user's sight (but not from the disk). Until the dustbin is specifically told to "empty", these files may be retrieved.

✓ Desktop compatible
✓ Configurable
✓ Well documented
✗ Limited use on a floppy-only system
✗ No sounds yet (sorry, just a winge!)

A good application of use to all hard disk owners. This performs very much as other dustbins do, but has more options available as far as confirmation of deletion and retrieval go and is, therefore, "safer".

!Backup3

This is a hard disc archival utility.

Not having a hard disc available, I am unable to exercise this product, but from my experience with the abysmal "PC-Tools", I am able to state the following:

This program runs when double-clicked but does not install on the icon bar (which is as it should be). Backups are performed from whichever ADFS or SCSI hard drive is named, to any ADFS floppy drive. Both "full" and "incremental" backups may be run – Full just grabs everything from the disk whereas incremental will only back up those files which have been modified or created since the last backup.

Of higher priority than the backup type is a file exclusion list. This list commands the program to avoid the directories specified and may, for example, be used to exclude all object files (exclusion of any directories called "o") or specific directories (e.g. "$.games").

Prompts for disks, and also the automatic formatting of blank discs take this program further, as do the help messages. The !help utility itself is well worth having (I wonder which PD disk that is on?). *(If you look carefully on Shareware 36, you should find !help in some of the applications directories. Ed.)*

✓ RISC-OS compatible
✓ Well integrated
✓ Well automated
✓ Well documented
✗ File restoration not automated

A feature packed program of use to all hard disk owners.

!FontDir

This is an application to control the outline fonts available to other applications.

Not having the modules that this application requires I am unable to test this.

- ✔ Desktop compatible

!CAST/CB

This is a cash book utility.

This program takes over the whole of the machine when double-clicked, but restores to the desktop OK on exit. It allows the user to maintain a monthly cash book with a variety of references to annotate each entry. Password protection is provided, as is the ability to print out each of the 10 books available.

- ✔ RISC-OS compatible
- ✔ Homogenous user interface
- ✘ Zero documentation
- ✘ No "preview", hard copy only

I found this hard to use, being but an engineer, and much of the detail was lost on me. However, I did find that I had problems making it do what I wanted to do – mainly due to the lack of listing facilities (hard copy only) and the total lack of documentation. On the plus side, the author avoided the temptation of using a mixture of mouse and keyboard for the user interface.

!CASTOCK

This is a stock control program and is similar to the above except that it is for stock control. The same criticisms apply.

!3D-graph

This is a graph plotting utility in 3D.

This program takes over the whole of the machine when double-clicked but restores to the desktop OK on exit. It allows the user to generate "surfaces" by entering an equation which describes the z axis in terms of x and y ($z = f(x,y)$), and a range of x and y values over which to plot the surface.

Once a surface is plotted, it may be rotated in all 3 axes, zoomed in and out, have hidden lines removed and be saved to disk as a !Draw compatible mode 15 dump. There is also a screendump, a means of entering, storing and retrieving favourite equations, a "gateway" to the RISC-OS command line and on-line help.

- ✔ RISC-OS compatible
- ✔ Good on-line help
- ✔ Picture export facilities
- ✔ Axis rotation, zoom, etc.
- ✘ Slow at times
- ✘ Equation entry awkward

A fascinating program of interest to budding mathematicians. The user interface rates highly against Tecnations "Very Wonderful Pagemaker" (which I still think is the best UI ever designed!) and makes the program a joy to use. My one criticism would be the inability to edit equations – which have to be typed in from scratch each time they are modified.

!STModFix

This is a utility to fix faulty soundtracker modules.

Not owning any ST modules I could not test this.

!Midi

This is a midi song/voice up/downloader.

Not owning a midi port, I cannot test this. However, the documentation and program commenting are so extensive that it just has to be useful for anyone wanting to learn about midi or write midi applications.

This is the kind of documentation level that programmers should aim for!

- ✔ Well documented
- ✔ Program well commented

ArcANSI

This is a module to give comms users ANSI 6429 escape code emulation.

This contains an emulator which traps ANSI escape sequences in serial communications and changes the screen/text colour and moves the cursor according to the code received.

Not owning a modem I could not test this out.

- ✔ RISC-OS compatible
- ✔ Well documented

IceManager

This is a module providing new SWI's to enhance the serial port.

Apart from baud rate and line control SWI's, this contains an ANSI escape code emulator and a call to allow the Archimedes to be controlled from the serial port (remote sessions!).

Not owning a modem I could not test this.

- ✔ RISC-OS compatible
- ✔ Good documentation

MiniTerm

This BASIC program is included to demonstrate the above – providing an ANSI terminal emulation in just 8 lines!

ModDis201

This program allows the user to disassemble relocatable modules.

This program takes over the whole of the machine when double-clicked but returns to the desktop OK on exit. It disassembles modules, making assembler listings of them. Some supervision is required and, apart from the example given, I was unable to disassemble any of the modules I tried due to my lack of familiarity with RISC assembler.

A powerful program of use to very advanced programmers.

- ✔ RISC-OS compatible
- ✔ Good documentation
- ✘ Limited use for average Archimedian

Conclusions

This is definitely a disk for communications enthusiasts, midi enthusiasts and hard drive owners. However, at the price, it is good value for anyone who wants to see how other programmers go about their business.

Pysanki, Drop Ship! & BugHunter II

Tord Eriksson

Three games arrived at the editor's feet and, in a moment of weakness, he let a foreigner from overseas do the testing. This is Tord Eriksson's report from Sweden (with some expert advice from his young nephew Peter).

Games for the Archimedes range comes in many sorts and tastes, from adventure games with no graphics, no time limit and no sound effects to full blown arcade games with stunning graphics, both music and sound effects and a clock that ticks mercilessly away.

We have tested three of the latter, even if two are more sedate, with no clock ticking away. All three are set in space, two are actually played inside a spaceship and all include sound, aliens and sudden death.

Tunnels of love?

In Pysanki (4th Dimension) you are the soldier of (mis)fortune that is sent to the ship Pysanki in an attempt to find the crew. As the Pysanki was carrying a large number of fossil eggs it is feared that some might have hatched anyway and the aliens gone missing somewhere in the ship's vast innards. You start by standing in a tube or tunnel with numerous interconnecting sidetunnels, hatchways and eggs – there are also nasty aliens, power packs and lethal computers dotted around this maze of tunnels.

The graphics are excellent and the very well rendered lonely man walks around the tunnel, blasting his way through tunnel walls, aliens and cargo. It is a huge maze and could take ages to go through, but the walk around will definitely not be boring! I began playing Pysanki using the mouse but that is definitely not recommended. Sadly, the reconfiguration does not allow the use of any key, just the A-Z keys and <space>.

This is, in essence, a steps-and-ladders game – in a deluxe version – but with few new thrills. I got bored after a while but my nephew Peter thought a lot of it, being an ardent gamester.

This is not the game for an hour's idle entertainment – this is the game for the ardent points collector, who'll be satisfied with nothing else but completing the game and finding the crew, or their remains! (I never found them!)

Drop Ship!

It is very easy to Drop the Ship (4th Dimension), so you are recommended by the manual to use the keyboard, instead of using the mouse. Initially, I didn't and it certainly was too much of a handful for me, so I quickly changed to keyboard control. This made things a little easier! The game comes on two discs, as usual for 4th Dimension games, and you can redefine the keys to suit your taste. The music and sound effects are nice and you have the option to turn them off if you do get tired of them.

Drop Ship is very arcade-like, with excellent graphics, the smoothest movements in town, nice sound effects and a good short demo. It is essentially a rapid action shoot-em-up with you commanding a small space ship in a system of caves, with lots of nasty cannons, etc. shooting at you.

In most modern arcade games, the view is from above the spaceship with no depth visible but this view isn't from above or the physics of the planet is drastically different from ours! It's a side-on view and gravitation pulls you mercilessly downwards all the time and makes your flight very erratic if you don't use a light hand on the controls.

As the time is ticking away relentlessly all the time and you have to refuel, shoot up the gun emplacements, collect the bonus points after you have dropped bombs on big "glass domes" and thus open the gateway to the next cave, you have your fill and more.

Even after many hours, we didn't get far through the maze of caves but the graphics were all the time impressive. This was not the favourite of my nephew or mine as it really is a bit too frantic. I'm sure many youths will love Drop Ship and many more would, if there was a way to slow it down a bit – a tutor mode, so to speak.

Bughunting in space!

Many seasoned gamesters will greet the news that there is a new Bughunter around with great joy. The delightful "Genus Hysterion Proterion", as the story goes, has (due to the unfathomable wisdom of some Galactic Command or other) been chosen to defend the world from an armada of alien spacecraft filled with… aliens. The single Bughunter has fought pests on earth like no one else, being a six inch high biped (i.e. 2 legged), big-mouthed something that the engineers dreamed up after a night on the town.

The plan was to make it into a super soldier with suction feet (it makes very odd sounds while walking!) and great strength. As you may already know, it turned to killing insects instead, alas with great success, and became a legend among Archimedeans around the world, for the sheer delight of controlling the little bastard. (i.e. "bastard (ba'stard) [O.F. bast (F. bbt), pack-saddle, late L. bastum (cp. BANTLING)], n. an illegitimate child; anything spurious, counterfeit, or false.", Collins CED).

I think the choice fell on the Bughunter due to the fact that the aliens are of similar size – no human would be able to enter the minuscule spaceships. Being unarmed and of low intelligence, the Bughunter In Space has to make do with what he finds in the alien spaceships to kill the inhabitants, as he seems to be fatally allergic to live aliens. He can't jump while carrying anything and, as jumping is essential for getting around, the Bughunter finds himself in tricky situations as he often has to drop the weapons he has found when aliens are around.

You have to exercise a modicum of dexterity and cunning to solve the problems you face along the way to fame in Bughunter In Space, but three lives are ample for most gamesters. I have tried it on my young nephew and he had as much (or as little) problem as I had in getting to the next room, so it's very much a family game.

The aliens are among the most likeable aliens around, all bearing a faint resemblance to Garfield! The scrolling is even and the graphics superb. Not wanting to give anything away, I have to tell you about the wheel-clamp, including the Police Coat of Arms, just like the one you find on traffic offender's cars in London and elsewhere. This is, to my mind, ultimate proof of the sneaky ways of traffic-wardens: they are there, wherever you are, and think nothing of clamping anyone, even minuscule alien spacecars!

A short note on the sound effects: the music seems to be made by the gang in Street *(Can anyone explain what Tord means by that? Ed.)* – always nice – especially so when Bughunter does his best in imitating a frog imitating Fred Astaire showing off to the public! (It really should have some sucker sounds included – but you can't have it all!)

In short, I haven't had as much fun for a long, long time! Bughunter In Space is fully recommended and available from Minerva for £17.95 (or £17 through Archive).

P.S. Try the "P for Piano"!

Starfleet Encounter

Alan Highet

Starfleet Encounter is an attempt at a cross between chess, wargaming and battleships with a little arcade action thrown in. Unfortunately it isn't any one of these.

For a start, the game is for two players only and I really think any game needs a one player versus the computer option especially with the current level of sophistication in computer games.

The game starts by allowing you to purchase your fleet of space ships and you are given credits for this purpose. There is then the option of defining sequences, similar to macros, but then it's on to the game. You see the two fleets of ships in plan view with the information and instruction panels below. The idea then is for each player in turn to instruct his ships to turn, move or fire and to engage in combat with his opponent in order, eventually, to defeat him.

The first problem is the same as with the game of battleships on a computer, you are both sitting at the same terminal and are both privy to each other's plans and moves. It really needs two terminals and two keyboards to make it work. Secondly, the method of programming your ships is overly complicated. In any one go, you can instruct one ship or a group of ships to turn or move in immediate mode or you can program them to perform a sequence of moves that you dictate or pre-program at the beginning. I found that, without pen and paper, I soon forgot which ship I was trying to move and this makes the computer partially redundant. When you are close enough to battle, you can fire missiles and when you are both ready, the game changes to an arcade style with both players needing to use the keyboard at the same time. Frankly this just doesn't work and it has probably only been put in to please the arcade gamers.

I think the game has been written by one or two wargamers for their own benefit and is a little too complicated for its own good. However, on the positive side, the program seems to have been well written with a good input routine and smooth but simple graphics. I don't think the game is yet available in this country nor how much it will cost but for someone who likes wargames and has a friend who will play as well, it may be a reasonable purchase.

My suggestion would be for the authors to release it into the Public Domain to start with and see what the public want as I may be wrong and there may be a market for this type of game but at the moment I do not think it would sell even if it were priced at less than ten pounds.

RoboLogo

Peter Thomson

RoboLOGO produces a screen image of 15 linked triangles. These triangles are shaped into a robot, the links allow relative movement of the triangles and changes in proportion under LOGO style commands. The figure is able to move any limbs, bend, turn or walk its way round the screen, and the triangles can be transformed into a turtle that draws a line or an aeroplane leaving a vapour trail.

The program comes on a single disc with a 90 page instruction booklet. The disc is unprotected so that a backup copy can be made and includes a hard disc installation utility though I was not able to test this being still confined to floppies! Installing the program follows the standard RISC-OS procedure, but uses the menu button to run from the icon bar.

It runs alongside Pipedream on a 2M A3000 without any problems but trying to run the demonstration alongside RoboLOGO produces a missing variable error, though it runs happily on its own. The demonstration shows a very limited sequence of the program's capabilities – I would have expected more.

When RoboLOGO is run, four windows are presented on screen. However, it was impossible for me to get any further without studying the guidebook in detail. Unfortunately (and this, in my opinion, is the main failing of this package) the guidebook is written in extremely complex language – many adult users would find it took a tedious few hours to work through it, and many children in the 11 to 16 year age range would find it impossible.

One particularly bad point is that although the screen display is based on icons – (28 of them special to the program) the text instructions refer to them by number each time. There is one poorly produced diagram in the text that links the icons to the numbers.

The program includes a very limited subset of LOGO instructions and about half of these follow the same syntax as Logotron LOGO, but there are enough differences to confuse a child .

The print option, like Logotron LOGO, only uses the *hardcopy option with no facilities to use the RISC-OS printer drivers. I found it disappointing that there are no facilities to transfer files to DRAW or PAINT.

The program is very clever and there is a need in schools for software to develop 3D geometry, but I am afraid that I will not be adding RoboLOGO to my list of programs suitable for children to use.

RoboLogo is £99.95 from Silicon Vision or £90 through Archive.

Armatron

Alan Highet

Armatron, from Z & Z Software is a multi-cavern shoot-em-up space game with a similar feeling to one or two other games on the market. It is a cavern adventure and you travel in a spaceship in a similar style to Thrust, etc although, with this craft, you can hover and also land on the cavern floor without loss of life.

The object of the game is to defuse the time bombs left behind by the Armatrons who have also left slaves and robots to guard the bombs. On reaching a bomb you have a short time limit to defuse it by cracking a code. If you are successful, you gain some gold tokens, if not, you lose a life. The gold tokens, of which more can be collected elsewhere, can be exchanged for extra equipment such as multi-directional guns and shields although only one item may be used at once and, as earlier weapons must be repurchased, careful thought must be given as to the order of play.

The graphics are reasonably colourful, the scrolling is flicker free and the sound is good with a pacy title tune but originality is what counts in games nowadays and I'm afraid this game is a little too predictable. However I believe the game is priced at £8.95 and, if this is so, it could sway people into buying it over similar, but more expensive, games.

RTFM Joystick Interface

Simon Burrows

For all you budding games players, there are now two different joystick interfaces available for the Archimedes, both of which allow you to connect two standard "Atari" type joysticks to your machine and provide the necessary software support to allow you to use the joysticks in games.

The interface marketed by the Serial Port plugs into the parallel printer port of the Archimedes, whilst the RTFM interface is fitted inside the machine into the socket which would hold an Econet interface if you had one. This means that the RTFM interface is no good to you if you have Econet fitted, but I doubt if this will affect many users.

The fitting instructions for the RTFM interface are clear and it is not difficult to fit the interface into place. The two joystick connectors are fitted on ribbon cables, which need to be fed to the outside of the machine in some way, so that you can plug the joystick(s) in. A half width blanking plate with two holes in it is supplied for the A3000, into which the connectors screw. However, for other machines, you have to pass the ribbon cables out through the casing of the machine, which is a little awkward.

Once the interface is fitted and you have plugged the joystick(s) into the sockets, you are ready to go. At the moment, very little software is written to work with joysticks and so a disc is provided with a module on it which allows the interface to be used with about fifteen of the more popular games around. If you write your own games, details are given of how to access the joystick from your own programs, although this cannot be done from BASIC.

Overall, this joystick interface is well constructed and fits nicely inside the Archimedes. The limiting factor with this product is the range of commercial games with which it can be used. With the prototype version which I have been using, support exists for the limited range of fifteen games and so it is important to check whether a particular game will work with the interface. I hope that in the finished product, RTFM will add support for many more games and hopefully a module allowing the user to select the keypresses simulated, as well as mouse simulation. Without these it is only of limited use – if these are added, then it will be a very good product.

IFEL	36 Upland Drive, Plymouth, Devon, PL6 6BD. (0752–847286)
Irlam Instruments	133 London Road, Staines, Middlesex TW18 4HN. (0784–451192)
Ivoryash Ltd	14 Perwell Close, Bredon, Tewkesbury, Gloucester, GL20 7LJ. (0684–73173)
Lingenuity (Lindis) (p26)	P.O.Box 10, Halesworth, Suffolk, IP19 0DX. (0986–85–476) *(–460)*
Longman–Logotron	Dales Brewery, Gwydir Street, Cambridge, CB1 2LJ. (0223–323656) *(–460208)*
Micro-Aid	Kildonan Courtyard, Barrhill, Girvan, S. Ayrshire, KA26 0PS. (0465–82288)
Micro Studio Ltd	22 Churchgate Street, Soham, Ely, Cambridgeshire.
Minerva Systems	Minerva House, Baring Crescent, Exeter, EX1 1TL. (0392–437756) *(–421762)*
Oak Solutions (p17)	Cross Park House, Low Green, Rawdon, Leeds, LS19 6HA. (0532–502615) *(–506868)*
Protokote Ltd	(Attn Andy Burnett), Unit 5, Water Lane Trading Estate, Storrington, West Sussex, RH20 3DW. (0903–743358) *(–746325)*
RESOURCE	Exeter Road, Doncaster, DN2 4PY. (0302–340331)
RTFM Software	43 Hill Street, St Hellier, Jersey JE2 4UA. (0534–67870) *(–68996)*
Smith & Wiggins	77 Edward Road, Fleckney, Leicester, LE8 0AD.
Silicon Vision Ltd	Signal House, Lyon Road, Harrow, Middlesex, HA1 2AG. (081–422–2274) *(–427–5169)*
Spacetech	21 West Wools, Portland, Dorset, DT5 2EA. (0305–822753)
Superior Software	Regent House, Skinner Lane, Leeds, LS7 1AX. (0532–459453)
Tap Consortium	34 Drake Gardens, Tavistock, Devon, PL19 9AT. (0822–613868)
Techsoft UK Ltd	Old School Lane, Erryrs, Mold, Clwyd, CH7 4DA. (082–43318)
Topologika	P.O. Box 39, Stilton, Peterborough, PE7 3RL. (0733–244682)
Type Mismatch	3 Tankerton Road, Whitstable, Kent, CT5 2AB.
Wild Vision	15 Witney Way, Boldon Colliery, Tyne & Wear NE35 9PE. (091–519–1455) *(–1929)*
Z & Z Software	Brecklands, Broad Oak, Shrewsbury, SY4 3AH.

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(The numbers in *italic* are fax numbers.)

4th Dimension	P.O. Box 4444, Sheffield. (0742–700661)
Abacus Training	29 Okus Grove, Upper Stratton, Swindon, Wilts, SN2 6QA.
Acorn Direct	13 Dennington Road, Wellingborough, Northants, NN8 2RL.
Acorn Computers Ltd	Fulbourn Road, Cherry Hinton, Cambridge, CB1 4JN. (0223–245200) *(–210685)*
Ace Computing	27 Victoria Road, Cambridge, CB4 3BW. (0223–322559) *(–69180)*
Aleph One Ltd	The Old Courthouse, Bottisham, Cambridge, CB5 9BA. (0223–811679) *(–812713)*
Apricote Studios (p25)	2 Purls Bridge Farm, Manea, Cambridgeshire, PE15 0ND. (035–478–432)
Atomwide Ltd (p6)	23 The Greenway, Orpington, Kent, BR5 2AY. (0689–838852) *(–896088)*
Avie Electronics	0603–416863 *(–788640)*
Base5 (p14)	PO Box 378, Woking, Surrey GU21 4DF.
Beebug Ltd	117 Hatfield Road, St Albans, Herts, AL1 4JS. (0727–40303) *(–60263)*
Calligraph Ltd	53 Panton Street, Cambridge CB2 1HL. (0223–461143)
Cambridge International Software	8 Herbrand Street, London, WC1N 1HZ. (071–833–4023) *(071–837–6077)*
CJE Micros	78 Brighton Road, Worthing, W Sussex, BN11 2EN. (0903–213361) *(–213901)*
Clares Micro Supplies	98 Middlewich Road, Rudheath, Northwich, Cheshire, CW9 7DA. (0606–48511) *(–48512)*
Colton Software (p18)	149–151 St Neots Road, Hardwick, Cambridge, CB3 7QJ. (0954–211472) *(–211607)*
Computer Concepts (p10/11)	Gaddesden Place, Hemel Hempstead, Herts, HP2 6EX. (0442–63933) *(–231632)*
Dabhand Computing	5 Victoria Lane, Whitefield, Manchester, M25 6AL. (061–766–8423) *(–8425)*
Dabs Press	22 Warwick Street, Prestwich, Manchester, M25 7HN. (061–773–8632) *(773–8290)*
David Pilling	P.O.Box 22, Thornton Cleveleys, Blackpool, FY5 1LR
Electronic Font Foundry (p5)	Bridge House, 18 Brockenhurst Road, Ascot, SL5 9DL. (0344–28698)
EMR Ltd	14 Mount Close, Wickford, Essex, SS11 8HG. (0702–335747)
GL Consulting Ltd	8 Agates Lane Ashtead, Surrey. (0372–272937) *(–279362)*
GMA mbH	Wandsbeker Chaussee 58, D–2000 Hamburg 76, W Germany. (010–49–40–2512415) *(010–49–40–2502660)*
Ian Copestake Software	10 Frost Drive, Wirral, L61 4XL. (051–648–6287)

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